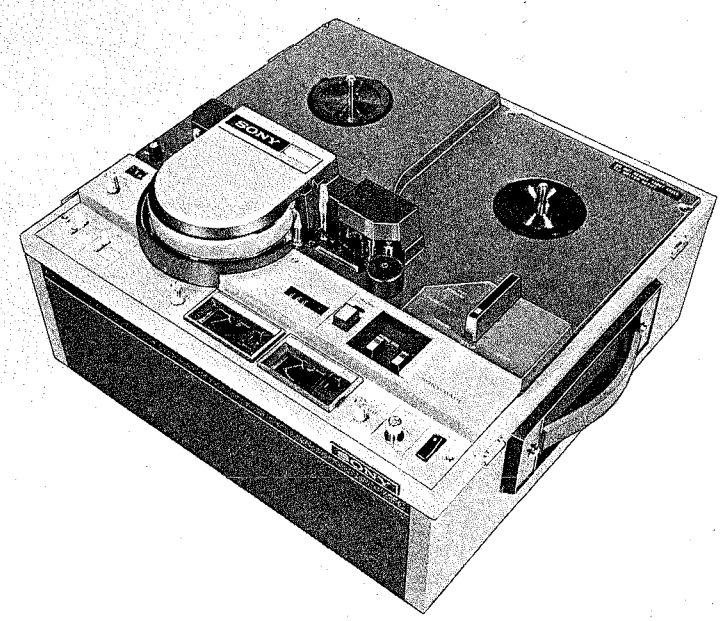
9014

# AV-3670ACE




SONY®

SERVICE MANUAL

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# SECTION 1
# GENERAL DESCRIPTION

## 1-1. INTRODUCTION

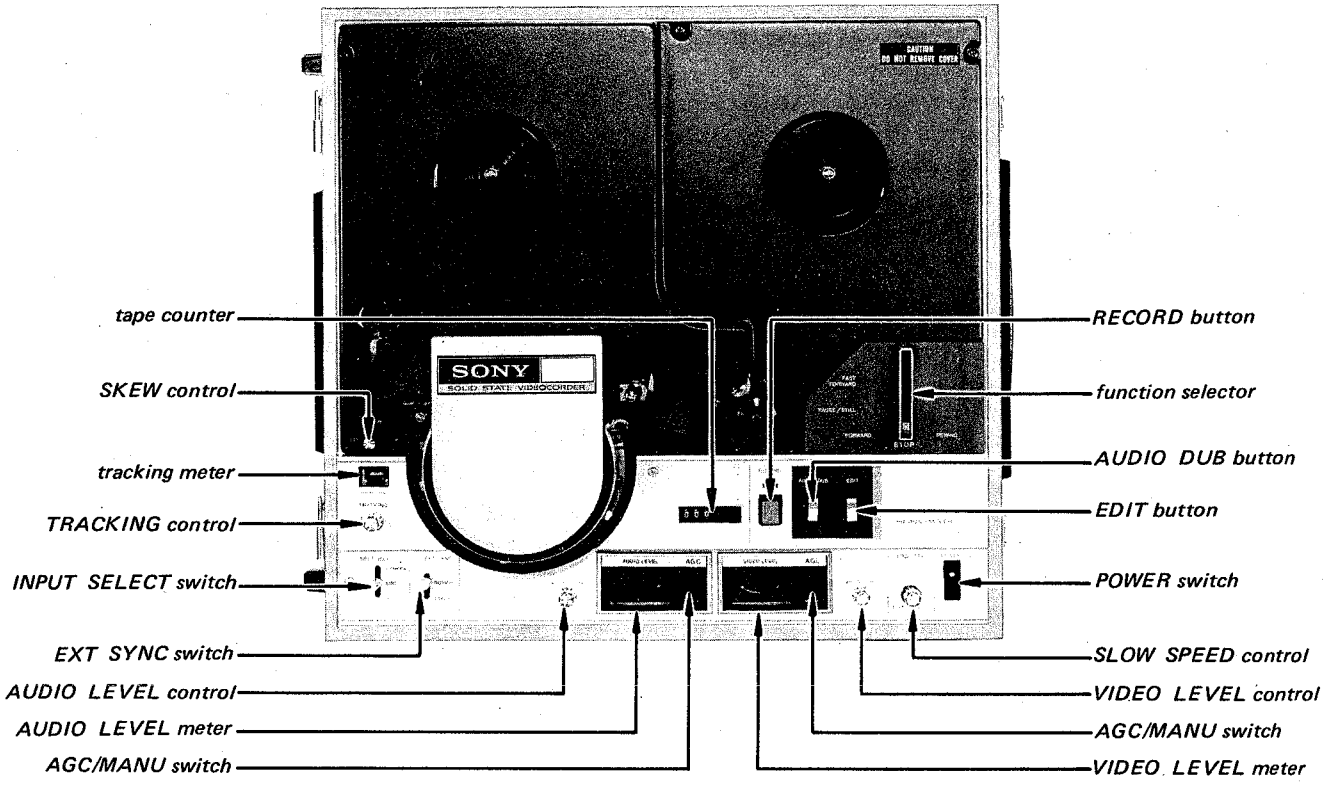
The SONY Model AV-3670ACE is a video tape recorder based on CCIR TV standards and incorporates the following features.

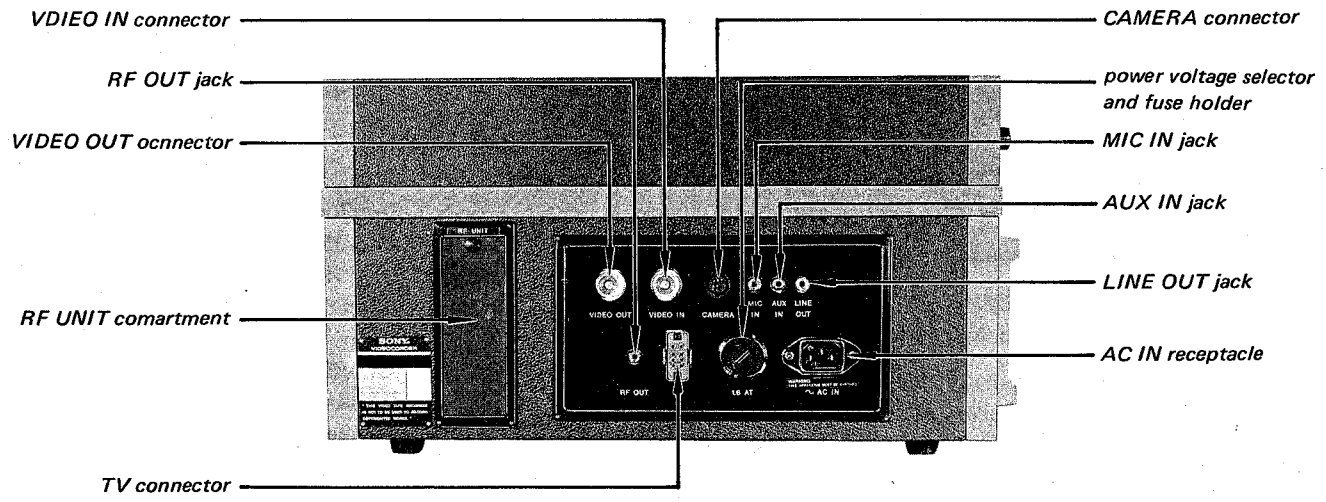
1. Audio and video recording levels can be controlled automatically or manually by the setting of the AGC/MANUAL switch. In the AGC position, the SONY-MATIC recording system assures perfect recording with very little effort. Audio and video level meters are provided for setting levels manually.
2. A capstan servo mechanism is employed for increased stability.
3. Resolution is more than 300 lines.
4. A still playback picture can be obtained by setting the Function Selector to PAUSE. Slow motion tape speed can be varied by turning the SLOW SPEED control.
5. New video and audio may be added or inserted into a previously-recorded tape in the playback mode. Editing is done electronically with the use of the capstan servo system.
6. A SKEW control adjusts tape tension in the playback mode. The tracking control regulates video-head tracking. The TRACKING meter indicates tracking condition.
7. With the use of a SONY RF Unit (available as an optional accessory) the recorded tape can be viewed on a conventional TV screen.

## 1-2. SPECIFICATIONS

| | |
|---|---|
| Video recording system: | Rotary two-head helical scan fm recording. |
| Recording signal: | CCIR standards or equivalent |
| Video input: | 0.5 – 2 V(p-p), 75 ohms, sync negative, unbalanced |
| Video output: | 1.0 V(p-p), 75 ohms, sync negative, unbalanced |
| Resolution: | Better than 300 lines |
| Video signal-to-noise ratio: | Better than 40 dB |
| Audio input: | MIC –65 dB, 600 Ω, unbalanced<br>AUX 0 dB, 100 kΩ, unbalanced<br>TV –20 dB, 100 kΩ, unbalanced |
| Audio output: | 0 dB, 10 kΩ, unbalanced |
| Frequency response: | 80 – 10,000 Hz |
| Audio signal-to-noise ratio: | Better than 40 dB |
| Tape speed: | 163.22 mm/s ±0.2% |
| Slow speed: | 1/5 – 1/15 of normal speed |
| Wow and flutter: | Less than 0.2% RMS |
| Recording time: | More than 60 minutes with SONY V-62 Tape |
| Rewind and F. Forward time: | Within 7 minutes for SONY V-62 Tape |
| Ambient temperature: | 0°C ∽ 40°C |
| Power requirements: | 110, 120, 220 or 240 V ac ±10%, 50 Hz ±0.5% |
| Power consumption: | 90 watts |
| Dimensions: | 440 (W) x 236 (H) x 405 (D) mm (17-5/16"(W) x 9-5/16"(H) x 15-15/16"(D)) |
| Weight: | 19 kg (41 1b, 14 oz) |
| Accessories supplied: | Reel, RH-7 V<br>Ac Power cord<br>DK-37 . . . . . UK<br>DK-39 . . . . . AEP<br>SONY Video Tape, V-60E<br>8-pin plug<br>SONY oil<br>Head cleaner set<br>Splicing tape<br>Polishing cloth |

## 1-3. EXTERNAL VIEWS



## 1-4. OPERATING INSTRUCTIONS

### 1-4-1. RECORDING

1. Complete the connections between the Videocorder and associated equipment.
2. Thread a tape and set the tape counter to (000) by pushing the reset button.
3. Push the POWER switch to turn on the Videocorder and turn on the connected components.
4. Set the INPUT SELECT switch to the proper position according to the input signal applied.
5. Depress the RECORD button until it locks into position. The red Recording Lamp will light to indicate that the Videocorder is ready for recording.
6. Set the AGC/MANUAL switch to AGC.
   The AGC Lamp above the level meter will light in green. No adjustment of video and audio signal levels is required.

   **Note:** If manual level control is desired, set the AUDIO and/or VIDEO AGC/MANUAL switch to MANUAL and, while watching the level meters, set each level control. Adjust the audio recording level so that the needle of the level meter does not swing past the green zone on sound peaks. Adjust the video recording level so that the needle of the level meter centers in the blue region of the scale.

7. To start recording, hold the RECORD button down and turn the Function Selector to FORWARD.
8. When the recording is finished, set the Function Selector to STOP.
9. If the tape just recorded is to be played back at once, set the Function Selector first to REWIND and then to STOP when the tape counter returns to (000).

### 1-4-2. PLAYBACK

1. Connect the monitor to the Videocorder.
2. Thread a recorded tape onto the Videocorder.
3. Turn on the Videocorder and monitor.
4. Set the Function Selector to FORWARD. The AUDIO and VIDEO LEVEL meters will indicate the recorded signal levels.
5. Adjust the controls on the monitor to produce the best possible picture and sound. Refer to the instructions supplied with the monitor.
6. When the tape is finished, set the Function Selector to STOP.

### 1-4-3. SLOW AND STILL PLAYBACK

When it is desired to slow the playback picture for close examination, use the slow and still facilities. A stop-action picture is obtained by setting the Function Selector to PAUSE/STILL. For slow-motion, pull up the SLOW SPEED control and turn the knob to set the desired speed. The tape speed can be controlled from one-fifth to one-fifteenth normal playback speed. To obtain normal tape speed, press the SLOW SPEED control. The SLOW SPEED control knob is also released when the RECORD button or AUDIO DUB button is pressed.

### 1-4-4. ADJUSTMENTS OF PLAYBACK PICTURE

The AV-3670ACE provides clean, stable pictures under normal operation. If, however, noise or picture distortion appears when playing a tape made on another AV-Series Videocorder, proceed with the tension and/or tracking adjustments.

1. *Tension Adjustment*

   Observe the playback picture on the monitor screen. Picture distortion in the upper part of the screen may be corrected by turning the SKEW control. This knob automatically returns to its center position when the RECORD button is pressed. Do not turn this knob while recording.

2. *Tracking Adjustment*

   Noise due to improper tracking in the playback picture may be corrected by turning the TRACKING control. Turn the TRACKING control while watching the TRACKING METER. Maximum deflection shows accurate tracking. For normal playback, turn the control fully counterclockwise to the FIXED position.

3. *Sync Select Switch*

   This switch is effective only when an external video source is connected to the VIDEO IN connector and the INPUT SELECT switch is set to LINE.
   In the NORMAL position, the playback video signal is locked to the external signal. In the DEFEAT position, the playback video signal is

locked to the ac power line frequency. When the playback picture is unstable or noisy, hold the switch down (DEFEAT position) to confirm whether or not the playback signal is influenced by the external video source. If picture distortion disappears with the switch in the DEFEAT position, disconnect the external video source from the VIDEO IN connector to lock the playback signal to the internal ac power line.

### 1-4-5. Playback On A Conventional TV Screen

The output signal of the Videocorder is converted to an ordinary TV (RF) signal when the RF unit (available as an optional accessory) is installed. The RF signal is fed to the antenna terminals of the TV set through the Antenna Selector supplied with the RF Unit. RF Units are available for either VHF Channel 3 (RFU-53CE) or UHF Channel 50 – 54 (RFU-50CEU, RFU-50UB), whichever is inacitve in your area.

1. To remove the lid of the RF Unit compartment, pull out the knob. Insert the RF Unit into the compartment and connect the Videocorder, RF Unit, and TV set. Plug the cord from the Antenna Selector into the RF OUT jack on the Videocorder.
2. Set the ANT/VTR switch on the Antenna Selector to VTR.

   **Note:** When the Videocorder is not in use, the TV set may be operated as a normal television receiver by setting the ANT/VTR switch to the ANT position and connecting the 300-ohm external antenna to the antenna terminals of the Antenna Selector.

3. Set the TV channel selector to the channel to which the RF Unit is set.
4. Set the Videocorder to the playback mode.
5. Adjust the fine tuning knob on the TV set to obtain the best possible picture.

   **Note:** When the RF Unit is not installed, no output signal is available from the RF OUT jack.

### 1-4-6. Editing Tape

When it is desired to add or insert a new video into a prerecorded tape, proceed as follows.

1. Complete the connections of all equipment and set the INPUT SELECT switch.
2. Set the AGC/MANUAL switch to AGC or MANUAL.
3. Set the Videocorder to playback and locate that part of the tape to be edited.
4. About 2 or 3 seconds before recording is to begin, press the EDIT button. To start the new recording, press the RECORD button the record lamp will light.
5. When the edit is finished, set the Function Selector to STOP.
6. When new video is inserted, press the EDIT button also after the edit is finished and after 2 to 3 seconds, set the Function Selector to STOP. Refer to the operating instructions for further details.

### 1-4-7. Dubbing Audio

If it is desired to insert (dub) new sound onto a previously-recorded tape, use the following procedure. Audio is dubbed with the Videocorder in the playback mode.

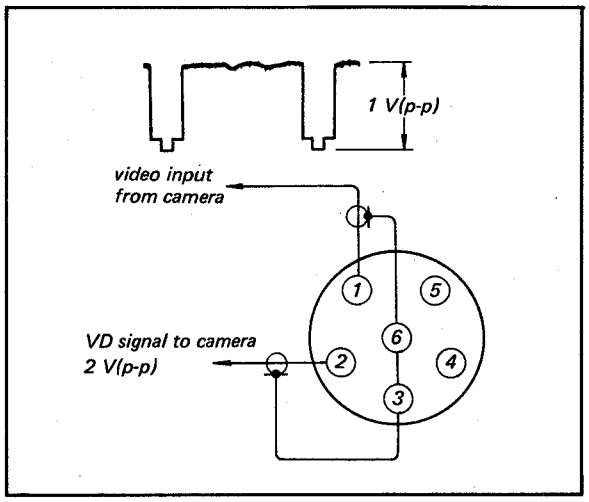
1. Connect a sound source to the proper Videocorder input; a microphone to MIC IN, or tape recorder, record player, radio, etc. to AUX IN.

   **Note:** The AUX IN jack is disabled when a microphone is connected.

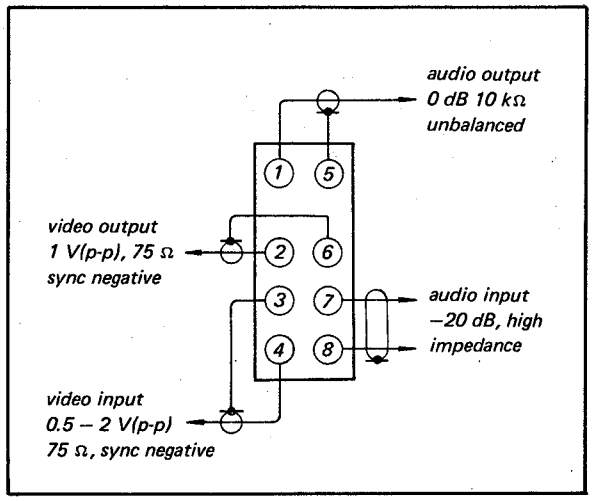
2. Set the INPUT SELECT switch to CAMERA or LINE.
3. Adjust the audio recording level.
4. Play back the prerecorded tape and when the desired position for dubbing sound is reached, press the EDIT button. Then press the AUDIO DUB button firmly. Sound dubbing starts when the AUDIO DUB button is locked into place. (The EDIT button will pop up when the AUDIO DUB button locks into place).
5. When dubbing is finished, set the Function Selector to STOP.

## 1-5. PIN CONNECTIONS

**6 pin camera connector**




**8 pin TV connector**



# SECTION 2
# CIRCUIT DESCRIPTION

Refer to the block diagram on page 2-13 and the schematic diagram in Section 9.

## 2-1. VIDEO CIRCUITS

Video information is recorded on the tape in the form of a frequency-modulated carrier. The video circuits on the V1 and V3 Boards process the video signal during record and playback operations.

In the record mode the video input is supplied to the V3 Board, where it is gain-controlled (automatically or manually), clamped, pre-emphasized, white-clipped, dark-clipped, fm modulated, and supplied to the record amplifier.

The video output signal from the record amplifier is supplied to the video heads through the slip rings and is recorded on the tape.

In the playback mode the recorded signals from the rotary heads are fed to the playback preamplifier on the V3 Board. The amplified video outputs are mixed together and these continuous fm signals are fed to the V1 Board.

The circuits located on the V1 Board include a limiter, differentiator, rectifier and demodulator. The video output from the V1 Board is a reproduction of the original video signal.

*Video Input*

PIN 4 of the TV (8-pin) jack for TV recording.
PIN 1 of the CAMERA (6-pin) jack for camera recording.
UHF connector for LINE (auxiliary) video input.

*Video Amplifiers and AGC – Q201 to Q204*

The incoming video signal is supplied to the first video amplifier Q202 through a pre-emphasis circuit consisting of R201 and C201. The input signal level for Q202 is controlled by AGC amplifier Q201 (FET), or R008 in the manual mode. Q202 and Q203 amplify the video signal and feed it to Q204. A sample of the video signal at the emitter of Q204 is fed to the peak detector consisting of D201, and D202. The output of the rectifier is a positive dc voltage that is proportional to the peak white component of the video signal. This dc voltage controls the conduction of AGC amplifier Q201 and this controls the amount of input signal to Q202. R201 and C201 accomplish pre-emphasis so that the AGC circuit is effective for high frequency signals.

*Low Pass Filter – L201, L202, C212*

The low-pass filter rejects the video signals at the high end of the band, such as the 4.43 MHz colour subcarrier and the 5.5 MHz audio i-f signal.

*Deviation Setting and Clamp – Q205, R221, D203, R228*

The output of the low pass filter is supplied to Q205 through R221.

R221 sets the video signal level to Q205 so that the following fm modulator produces an fm signal of 1.4 MHz deviation, from 3.8 MHz to 5.2 MHz.

D203 clamps the sync tip of the composite video signal to the reference voltage picked off at the arm of R228. This reference voltage sets the sync tip (or no-signal) frequency of the fm modulator. R228 is set to establish the sync tip carrier frequency of 3.8 MHz.

*Pre-emphasis and amplifiers – Q207, Q219, R231 Q232, C217*

The dc clamped video signal is applied through Q207 to the pre-emphasis circuit consisting of R231, R232, and C217 to improve the signal-to-noise ratio of the video information, and then to grounded-base amplifier Q219. Base-bias voltage for Q219 is supplied from the arm of R228.

*White Clipper, Dark Clipper, and Mod. Driver – Q208, D204, R237, D205, R238*

The pre-emphasized video signal contains overshoot in both the positive and negative directions. D204 limits the maximum positive signal (white peaks) of Q219 to the voltage picked off at the arm of R237. D205 clips negative spikes. Video from D204 is fed to the modulator through modulator driver Q208.

*Modulator – Q209, Q210*

The modulator is a free-running symmetrical multivibrator. Frequency control is achieved by returning both bases to the low-impedance source of modulating voltage—the emitter of Q208—through R241. Frequency varies from the tip-of-sync value of 3.8 MHz to a maximum 5.2 MHz for peak white signals. R248 and C251 are adjusted to obtain a symmetrical output waveform (equal pulse durations and slopes for each half cycle). Waveform symmetry is important as it determines the extent to which carrier energy can be removed from the demodulated signal. The push-pull modulator output is converted to a single-ended feed by T201.

*Record Amplifiers – Q211, Q212, Q213, Q215, Q216*

The fm signals from the modulator is applied to record amplifiers Q212/213 and Q215/216 via buffer Q211 and RF gate Q108 on the ED6 Board. Q213 and Q216 dirve the video heads through dirver transformers T202 and T203. The record amplifiers

operate in the Record mode only, as B+ is switched off in all other modes. R260 and R269 adjust the recording current applied to the video heads for optimum recording level.

*Over Record Current Circuit –Q214, Q217, Q218*

When the EDIT button is pressed, +28 V is applied to the bases of Q214 and Q217 turning them on, which shorts record amplifier emitter resistors R267 and R276 and boosts record current 40∽75%. Since the erase head is not energized, a double recording results during the 2 to 4 second interval between actuation of EDIT and RECORD buttons and a herringbone interference pattern may be seen on the screen. When the RECORD button is pressed, +28 V is removed from the switching transistors, but the charge on C236 keeps the switchers "on" an additional 2 to 4 seconds.

*Edit Mode, +B and RF Signal Gate Circuit – ED6 Board*

The switching from playback amplifier to the record amplifier when the edit mode CUT-IN is performed, is made by selecting the B+ power to be supplied either to the playback amplifier or record amplifier. The RF signal is also gated in the instance of CUT-IN initiation starting when the B+ is applied to the record amplifier until the record amplifier reaches to the full operating conditions.

A long as the VTR is in playback mode, the PB +28 V is applied to Q811 base to turn on Q811 that turns off the B+ power switchers Q810 and Q809 so that B+ power is not supplied to the record amplifier. The RF gate circuit Q808 is also closed by not supplying bias to Q808.

When the CUT-IN is attempted by setting the REC/PB switch S201-8 to the record position, the bias to Q811 is turned off that turns on Q810 and Q809 so that the B+ power is supplied to the record amplifier. Q807 is the gate drive circuit. When Q809 is turned on to supply B+ power, the Q806 charging current turns on Q807 to delay the RF gate Q808 operation. This circuit operates in the same manner in the normal record mode, too.

*Video Heads*

A slip-ring and brush assembly couples recording current to Video Heads A and B. The Video Heads supply signals during playback operations. The angle between the heads is 180° ± 20". Video Heads are type H 01-12.

*Playback Amplifiers –Q220, Q222, Q223, Q225*

Outputs from the video heads are coupled through T204 and T205 (load ratio 1 : 1) to their respective playback amplifiers. The low-noise cascode amplifier Q220 (Q223, FETs) and Q222 (Q225) amplify the weak signals. A resonant circuit in the gate of Q220 (Q223), consisting of T204 (T205), R283 (R285), and C237 (C240), resonantes with the reactance of the head and increases the output from the head at the resonant frequency to provide high frequency compensation for head-to-tape characteristics.

*Switchers and Mixer –Q221, Q224, Q226*

The Channel A switching transistor, Q221, is employed in the source of Q220. Similarly, Channel B employs switching transistor Q224 in the source of Q223. The states of Q221 and Q224 are always opposite. For example, when Q221 is saturated, Q224 is cut off by the opposite-phase rectangular switching pulses from M405 (hybrid IC) on the SV4 Board. When Q221 is ON, the source of Q220 is shorted to ground, so that Q220 can amplify rf signals. Output from Head A is amplified by Q220 and Q222 and routed to the following playback amplifiers during positive excursions of the switching waveform. While output of Video Head A is gated, the output of Video Head B is blocked from the playback amplifiers. This is done as follows:

When Q224 is cut off (Q221 ON), the cascode amplifier of Channel B can not amplify Head B output because of the high impedance (L204) in the source of Q223. The conditions described above are reversed with each 180° rotation of the head drum by the signals from two 25 PG coils mounted on the scanner. Thus, the output of each head is alternately coupled to Q226 and combined into a continuous rf signal without any noise.

*Equalizing Amplifiers –Q227, Q228*

The rf signal from Q226 is amplified by Q227 and fed to the limiters through Q228. The collector circuit of Q227 contains a resonant circuit consisting of R293, L205, and C249 which provides playback equalization. L205 sets the resonant frequency to about 4 MHz for correct playback equalization. The rf output is fed to the V1 Board.

*Limiter and Buffer IC301, Q301*

The limiter stage eliminate amplitude fluctuations caused by variations in head-to-tape contact. Limiting is accomplished by IC301. R305 is adjusted for a correct operating point to produce a symmetrical limiter output waveform. Limiter output is fed to the demodulator via buffer Q301.

*Demodulator – D311, D312, Q310, LPF*

The input to the demodulator is differentiated by R310 and the primary winding of T301. The push-pull output of T301 is applied to a frequency doubler consisting of a pair of pulse detectors Q302 and Q303. They conduct on alternate half cycles to produce two positive output pulses per input cycle. Thus, carrier frequency is effectively doubled and placed outside the video passband. By integrating the pulse output in the low-pass filter. A video output is obtained that is proportional to pulse frequency. R315 is set to balance the pulse output of the frequency doubler.

*Video Amplifiers – Q302, Q305*

Video output from the low-pass filter is amplified by Q304 and Q305 and then supplied to the noise eliminator. The collector circuit of Q304 contains a de-emphasis circuit consisting of R323, C317 which reduce high-frequency gain to provide de-emphasis.

*Noise Eliminator – Q308 – Q312, D303, D304*

The demodulator output signal is supplied to the input of the noise eliminator where it is separated by high-pass and low-pass filters into high-frequency and low-frequency components. Separated low-frequency components are supplied to a mixer circuit through buffer Q308. Separated high-frequency components are amplified and supplied to a diode slicer circuit. The slicer circuit consists of two back-to-back diodes connected in parallel and removes all noise lower in amplitude than the diode conduction level. The slicer output is supplied to the mixer circuit where low-frequency components and high-frequency components less noise are mixed to reproduce the original video signal without the noise. Fig. 2-1 shows the noise eliminator circuit block diagram.

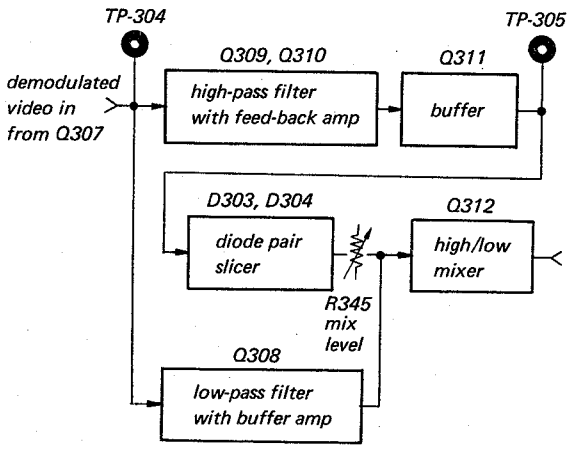



*Fig. 2-1. Noise eliminator circuit diagram*

*Video Output – Q313 – Q315*

Video output from the noise eliminator is supplied to the video output stage (Q314, Q315). Q314, Q315 consist of shunt-regulated, single-ended push-pull amplifier that distribute the video output signal.

*Slow Mode Pulse Amp and Mixer – M301, Q306 Q316*

B+ to this circuit is applied only in the Slow mode. M301 is a monostable multivibrator triggered by 25 PG pulses A and B to produce a 50 Hz rectangular pulse. Q316 amplifies the pulse and feeds it to Q306 where it is inserted into the video signal in place of vertical sync. This greatly increases vertical stability in the Slow mode that would otherwise be upset by gurad-band noise. R377 adjusts the time constant of the multivibrator to position the 50 PG pulse on the front porch of vertical sync.

*Video Meter Driver – Q319*

Q319 supplies the demodulated video signal to detector diodes D321 and D322 which drive the level meter.

*Tracking Meter Driver – Q317, Q318*

A sample of the playback rf signal is supplied to buffer Q317, amplified by Q318. The output of Q318 is fed to peak recitfier D308 and D309, the output of which drives the tracking meter.

## 2-2. SERVO CIRCUIT

The AV-3670ACE contains both drum-servo and capstan-servo circuits. The drum servo regulates the rotational phase and speed of the head drum. The capstan servo regulates tape speed by controlling the capstan rotation.

The block diagram of the servo system is shown in Fig. 2-2 and the waveforms in Fig. 2-9. In drum-servo operation, vertical sync separated from the video input is compared with the 25 PG signal and an error voltage is fed back to regulate the drum rotational phase and speed. In capstan-servo operation, the signal produced from the frequency generator (built into the dc motor) supplies a reference for a constant-speed servo. The capstan servo also has a phase servo in addition to the constant-speed servo. In phase servo operation, the output of the frequency generator is compared with the phase of vertical sync and an error voltage is fed back to the constant-speed servo in the record mode. In playback, control-signal output and 25 PG signals are compared in phase, and the error signal is fed back to the constant-speed servo.

| | Record | | | Playback | | |
|---|---|---|---|---|---|---|
| | Comp. signal | Refer. signal | Function | Comp. Signal | Refer. signal | Function |
| **Drum servo** | 25 PG | VD | drum constant speed | 25 PG | VD | drum constant speed |
| **Capstan Phase servo** | FG (1,000 Hz) | VD | constant capstan speed | CTL | 25 PG | tracking servo |
| **Capstan speed servo** | FG (1,000 Hz) | dc voltage | constant capstan speed | FG (1,000 Hz) | dc voltage | constant capstan speed |

VD: Vertical drive signal derived from separated sync

*Table 2–1*

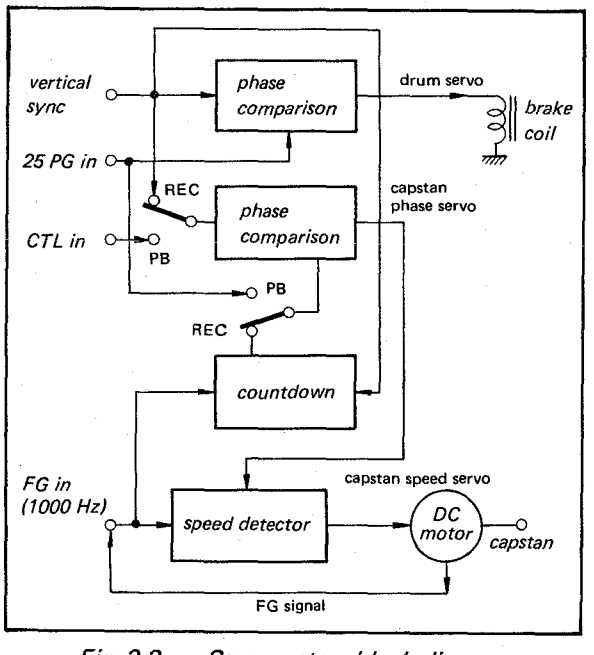



*Fig. 2-2. Servo system block diagram*

### 2-2-1. Drum Servo (SV2 Board)

The phase of separated vertical sync and the phase of the 25 PG signal are compared. The error voltage is amplified and fed to the brake coil in order to control head drum rotational speed. Refer to the block diagram Fig. 2-3 and waveforms in Fig. 2-4.

| *Stage/Conttol* | *Function* |
|---|---|
| Sync separator Q101 | This is a conventioanl sync separator to separate sync from the input video singal. |
| Low pass filter R106 ~ R108 C103 ~ C105 | Removes horizontal-sync signal so that only vertical sync appears at the output. |
| Pulse amp Q105 | Vertical sync is supplied to Q105 through C111. When vertical sync is not supplied during playback, a pulse formed from the ac |

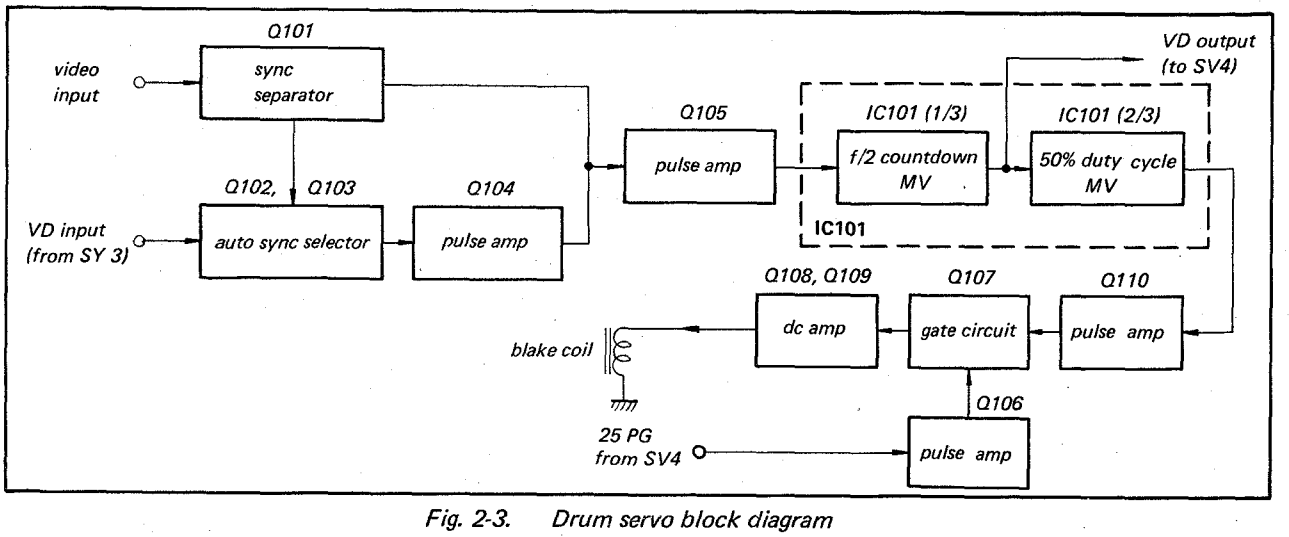



*Fig. 2-3. Drum servo block diagram*

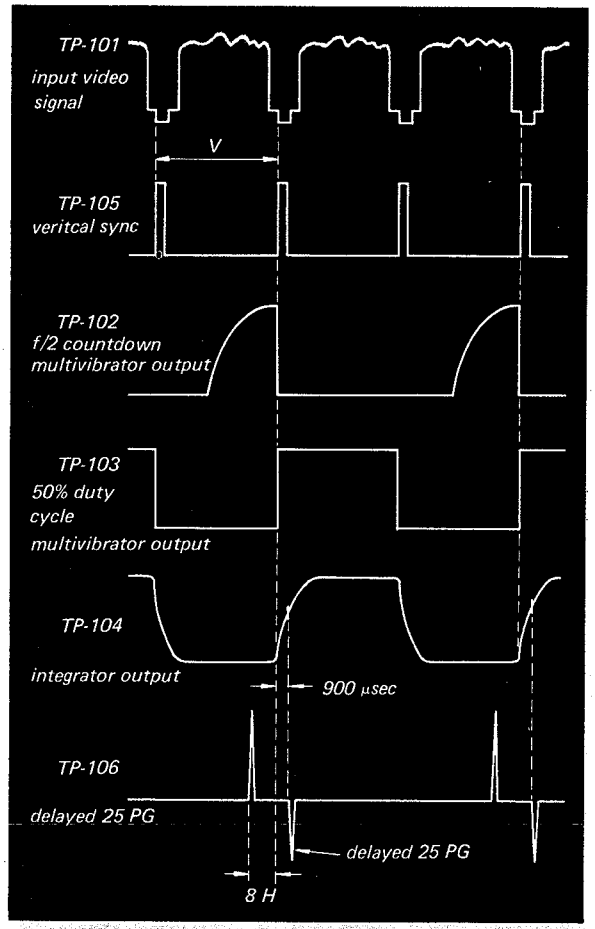



*Fig. 2-4. Drum servo signal phase relations*

| *Stage/Control* | *Function* |
|---|---|
| | source is supplied to Q105 through C110. The vertical sync or line-drived pulses trigger the monostable multivibrator IC101. |
| Buffer and detector Q102, D103, D104 | Detects presence of the sync signal at the sync separator. The d-c level is supplied to the base of the transistor Q103 when vertical sync is present (only when the video input is supplied). |
| Auto sync selector Q103 | Q103 is ON as long as the video input is supplied and then, a 50 Hz pulse formed from the ac source is grounded through Q103 collector-emitter. Conversely when the video input is not supplied, Q103 is OFF. The 50 Hz pulse is then supplied to Q105 through Q104. |
| f/2 countdown multivibrator IC101 (1/3) | 50 Hz separated sync is counted down to a 25 Hz rectangular pulse. The output signal is supplied to IC101 (2/3), and to the capstan servo on the SV4 Board. |
| Multivibrator IC101 (2/3) | 25 Hz output signal triggers IC101 (2/3) to produce a 50 : 50 duty-cycle rectangular pulse. |
| Pulse amplifier Q110 | Output of the IC101 (2/3) is amplified and supplied to integrator. |
| Integrator R132, C120, C128 | Output of the Q110 is integrated and supplied to the emitter circuit of gate Q107. |
| PG amplifier Q106 | The delayed 25 PG pulse is amplified by Q106 and supplied to the base circuit of gate Q107. |
| Gate Q107 | The integrated waveshape at the emitter of Q107 is gated by the delayed 25 PG at the base. The output is obtained at the collector of Q107. |
| Dc amplifier Q108, Q109 | The output signal containing the error voltage is amplified and supplied to the brake coil of the head drum. C124 is the hold capacitor. |

### 2-2-2. Capstan Servo (SV4 and SV5 Board)

An independent capstan motor is used for tape transport in the capstan servo loop. A dc motor is employed that has a built-in frequency generator with 30 Hz output per single revolution. The normal speed of the capstan rotation is 33.3 rps so that the generator produces 1000 Hz.

*Capstan Speed Servo (SV5 Board)*

The block diagram of the capstan speed servo is shown in Fig. 2-4 (b) and the schematic diagram in Fig. 2-5. The frequency generator output (1000 Hz sine-wave) is amplitude limited to shape the signal into a rectangular pulse, that is then transformed into sawtooth. It is sliced by a reference dc level that produces rectangular pulse. When the capstan motor speed is changed, the width of the rectangular pulse is changed in inverse proportion. The rectangular pulse is transformed into the sawtooth wave, which is sliced by

the error signal of the capstan phase servo circuit. The sliced output is amplified by a power amplifier in order to drive the dc motor.

| *Stage/Control* | *Function* |
|---|---|
| IC701, CX-032B | SONY integrated circuit type CX-032B is used in both audio and video tape recorders. |
| Limiter Q1, Q2 | Shapes the frequency generator output sine-wave signal from the capstan motor to rectangular pulses. |
| Pulse amplifier Q3 – Q5 | Amplifiers the limiter output and feeds it to the following differentiator and, at the same time, to the capstan phase servo Q408 on the SV4 Board as the gate pulse. |
| Differentiator C704 | Generator output is differentiated by C704 and the base resistance of Q6 (1 kΩ) to form a spike waveform. |
| Sawtooth wave generator Q6, C705 | The sawtooth wave is generated by charging and discharging C705. During the "off" period of Q6, C705 is charged by the B+ supply. The pulse input turns on Q6 to discharge C705 and develop the sawtooth wave synchronized to the frequency generator signal. |
| Slicer Q7, Q8 | Q7 and Q8 form a differential amplifier. A constant voltage of about 2 V is fed to the base of Q8 while the sawtooth wave is fed to Q7 base so that the sawtooth wave is sliced at a reference dc level set by Q8. |
| Peak amplifier Q9 – Q11 | The slicer circuit output is shaped into a rectangular pulse by a saturation amplifier. Here, the rectangular pulse is obtained, the width of which is changed by the fluctuation of the capstan motor rotation. |
| Pulse width modulation circuit Q13, Q14, Q701, Q702 | The rectangular pulse output of Q11 is again shaped into a sawtooth wave, and fed to the slicer circuit and then power amplifier stage. The rectangular pulse output is fed to point (A) in Fig. 2-6 so that an output sawtooth wave is obtained at point (B) by capacitor C702. The sawtooth wave is sliced by the differential amplifier consisting of Q13 and Q14 in the IC and Q701 and Q702 at the error voltage level of the phase servo circuit. Output of the slicer is supplied to the low-pass filter. |
| Low-pass filter R718, C716 | Output of the pulse width modulator is filtered by R718 and C716 to convert the signal to DC component. |
| Motor dirve amplifier Q703, Q704 | Amplifiers the low-pass filter output in order to dirve the dc capstan motor. |
| Capstan motor M002 | This is a SONY type D721-F dc motor. Power voltage is 9 V, 350 mA current with a built-in |

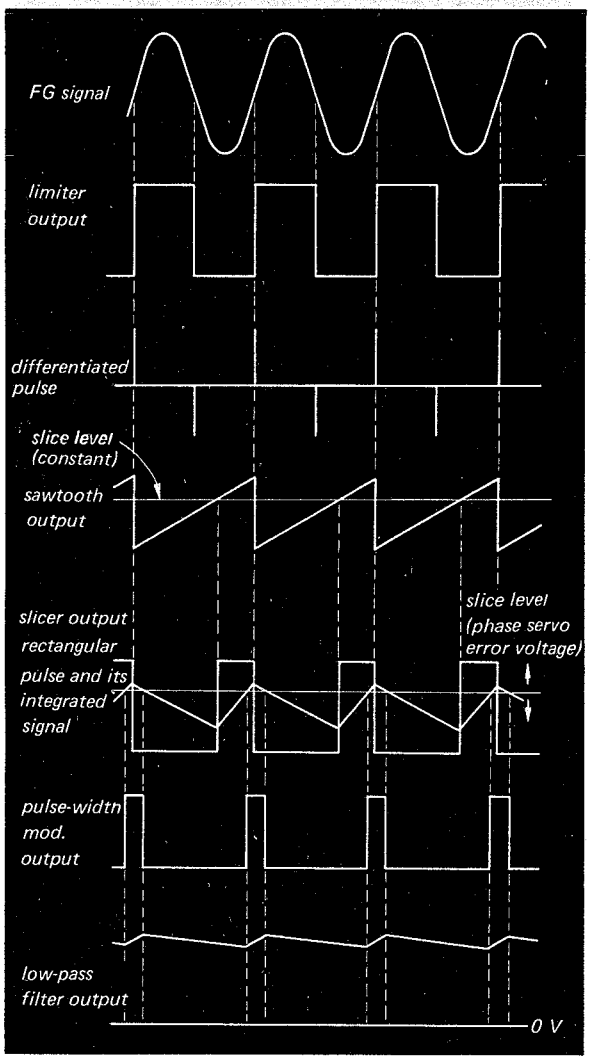



*Fig. 2-4 (a). Capstan speed servo waveforms*

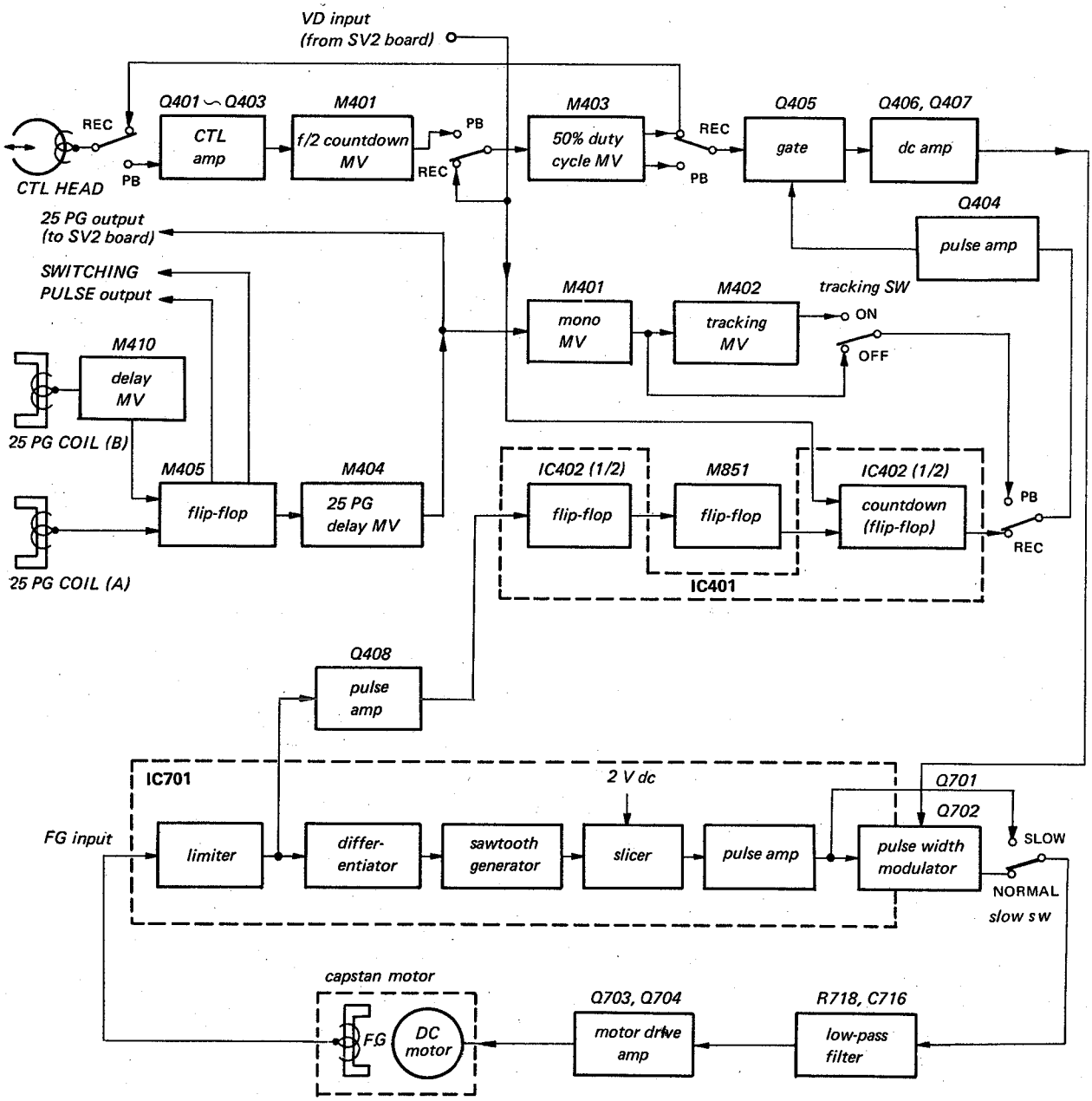



*Fig. 2-4 (b). Capstan servo block diagram*

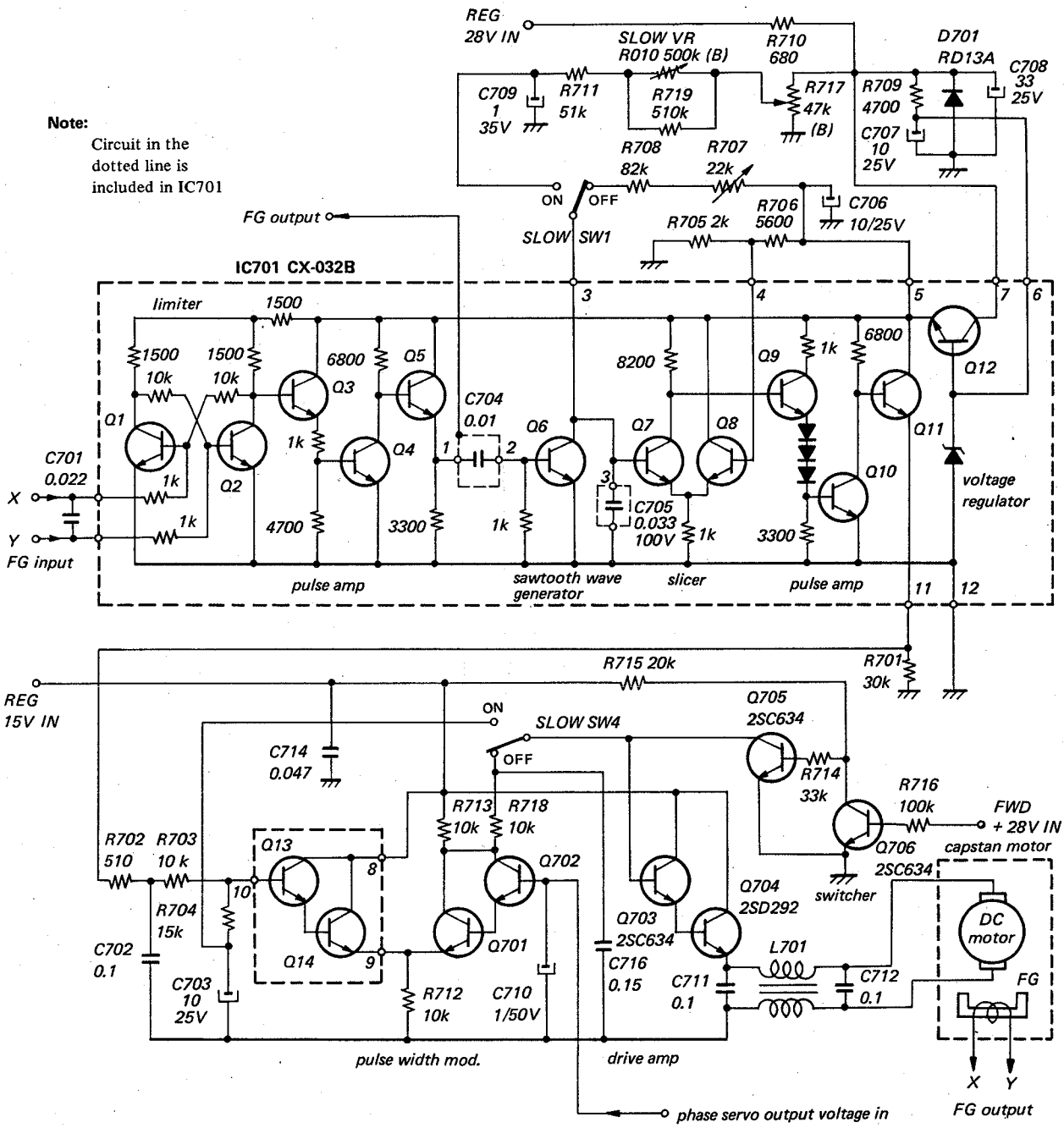



*Fig. 2-5. Capstan speed servo schematic diagram*

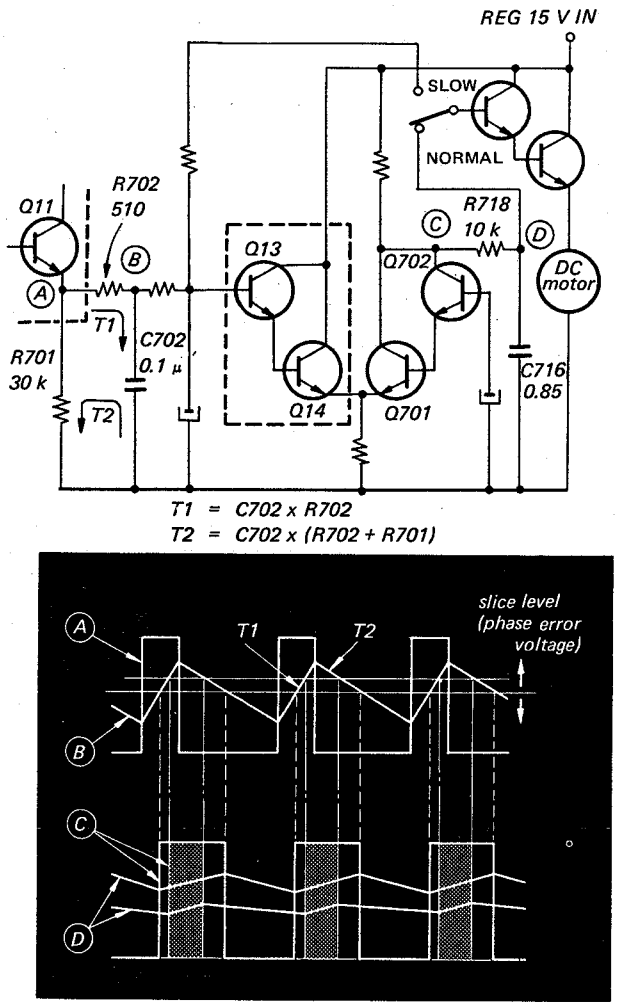



*Fig. 2-6. DC Motor drive circuit*

| *Stage/Control* | *Function* |
|---|---|
| | frequency generator that supplies 30 Hz per single revolution, so that is produces 1000 Hz. Generator output is more than 10 V (p-p). |
| Regulator Q12 (in the IC) | Q12 is a conventional series regulator that provides +7 V dc for the integrated circuit. |
| Switcher Q705, Q706 | The capstan motor contains a switching circuit so that it is powered only in the forward mode. When the function selector lever is in any mode other than FORWARD, Q705 conducts in order to ground the base of Q703 cutting off Q703 and Q704 to turn off power to the capstan motor. When the function selector is in the FORWARD position, 28 V power is fed to the base of Q706 to turn on Q706 and turn off Q705 to supply power to the dc motor. |

*Record Mode Capstan Phase Servo (SV4 Board)*

The capstan phase servo functions in addition to the capstan speed servo in order to lock the capstan motor rotational phase (FG) signal to vertical drive to remove the tape speed variations.

| *Stage/Control* | *Function* |
|---|---|
| 50 % Duty Cycle multivibrator M403 | M403 is triggered by the 25 Hz pulse that is counted down from 50 Hz by the drum servo. The output pulse can be obtained from Pins 2, and 3. The output pulse from Pin 3 is supplied to the integrator circuit and to the CTL head. |
| Integrator R440, C424, C455, C456 | The rectangular pulse output from M403 is shaped into a saw-tooth wave by the integrator and then supplied to the emitter of gate Q405. |
| Pulse amplifier Q408 | The frequency-generator signal fed from Pin 1 of IC701 is amplified by Q408 and supplied to flip-flop IC401. |
| Countdown flip-flop IC401 (1/2), M851 | IC type M-5946 contains four NAND circuits. Two NAND circuits comprise one flip-flop so that the IC houses a pair of flip-flops. With appropriate feedback connections, the 1000 Hz frequency-generator signal is counted down to 250 Hz by the two flip-flops. |
| Countdown flip-flop IC401 (1/2) | The 250 Hz signal is counted down to 25 Hz by this flip-flop with vertical drive signal as shown Fig. 2-7. The pulse width of the output signal is the servo error signal the output signal is differentiated so that the trailing edge is isolated and emploxed as the gate pulse. |

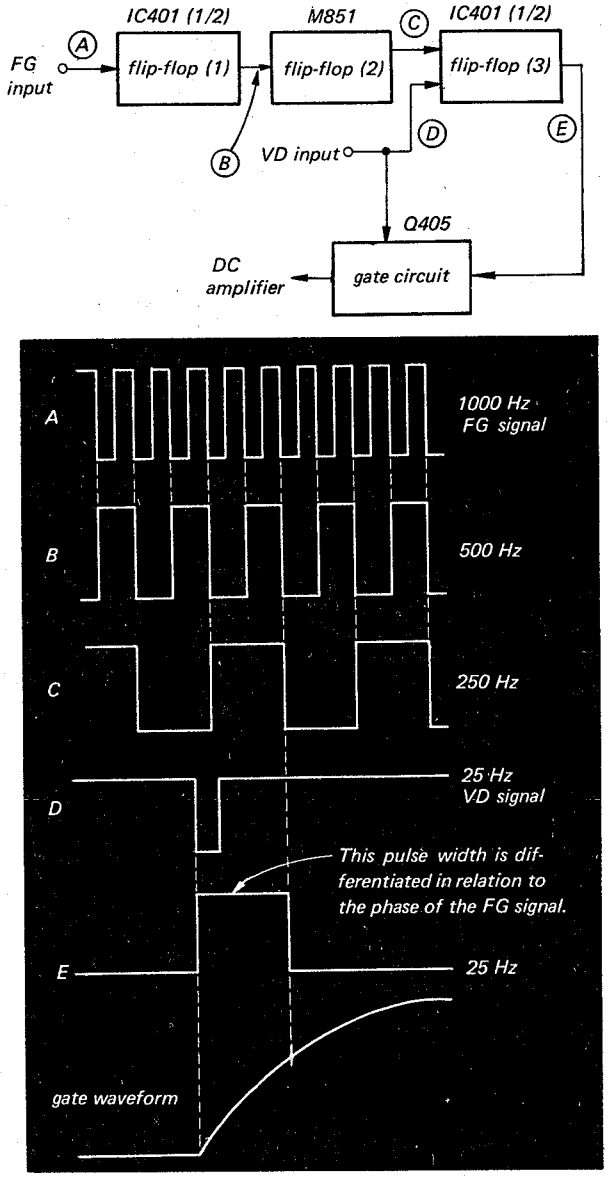



*Fig. 2-7.*

| *Stage/Control* | *Function* |
|---|---|
| Pulse amplifier Q404 | The 25 Hz frequency-generated signal is differentiated so that only the negative pulse is amplified and supplied to the following gate circuit as the gate pulse. |
| Gate Q405 | The sawtooth wave fed to the emitter of Q405 is gated by the gate pulse fed to the base. The output signal is obtained from the collector and charges the hold capacitor C428. |
| DC amplifier Q406, Q407 | Q406 and Q407 amplify the phase-servo dc output across C428 and supply it to the pulse-width modulator Q701 base of the capstan speed servo circuit on the SV5 Board. Durring the servo start-up period the phase-servo error voltage can be as low as zero. In order to prevent abnormal rotation of the capstan motor during this period, limiter D408 and D409 and zener diode D410 is inserted in the output circuit. |
| Switcher Q415 | When the servo system is energized the phase servo starts up faster than the speed servo. In order to prevent malfunction of the speed servo at this time the switcher circuit delays the starting of the gate circuit.When the function selector is set in FORWARD position, the charging currents of C445 cause Q415 to conduct to turn off the gate circuit for two to three seconds. |

*Playback Phase Servo*

The playback phase-servo obtains the error signal by comparing the 25 PG signal with playback CTL signal. The error signal is introduced into the capstan-speed servo in order to obtain correct video-head tracking.

| *Stage/Control* | *Function* |
|---|---|
| 25 PG delay multivibrator M401 | It delays 25 PG pulse (B) until the 25 PG pulse (B) is positioned 180 degrees with regard to the 25 PG pulse (A) effectively on rotary head drum mechanism. |
| PG pulse former M405 | The pulse from the PG coil and the delay multivibrator triggers the flip-flop (type CF-001) at Pins 1 and 4. A rectangular output pulse is obtained at Pin 2 and 3 in opposite polarity. Part of the output signal is routed to the demodulator circuit (V1 Board) to form the 50 PG that is inserted into the playback video signal in the slow motion mode. Part of output from Pin 3 is differentiated in order to trigger M404, the delay multivibrator. |

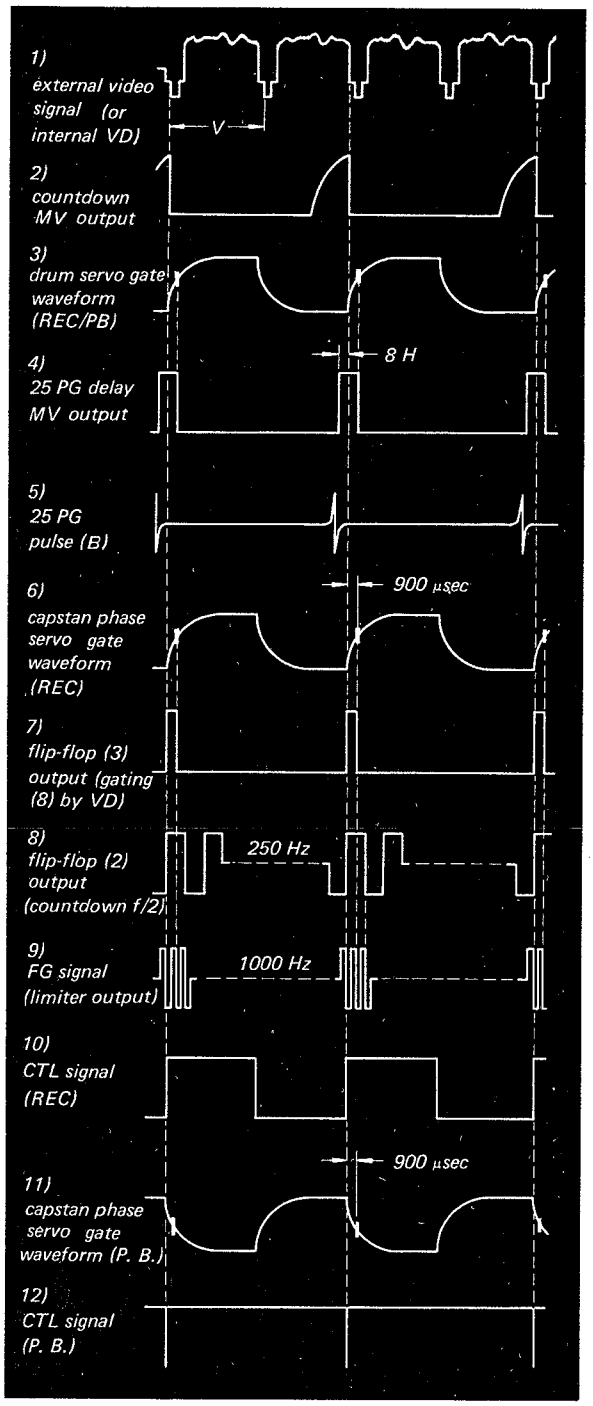



*Fig. 2-8. Servo circuit waveforms*

| *Stage/Control* | *Function* |
|---|---|
| 25 PG delay multivibrator M404 | This is a monostable multivibrator used to delay the 25 PG pulse before feeding it to the playback phase servo and drum servo. |
| CTL amplifier Q401 – Q403 | The playback CTL signal is amplified to trigger the monostable multivibrator M403. |
| 50% Duty Cycle multivibrator M403 | M403 and the subsequent circuit functions the same in playback as it does in record. However a gate pulse gates the sawtooth wave on its trailing edge in the playback mode while it gates the leading edge in the record mode. |
| Tracking control circuit M401, M402 | The tracking control circuit shifts the phase of the 25 PG signal electronically by using two multivibrator in order to compensate for differences in the physical displacement of the CTL head. |

*Slow Motion Playback*

During slow-motion playback, the drum servo functions in the same manner as in normal playback. The capstan phase servo is disabled. The capstan speed servo is controlled by a variable resistor so that the tape speed is varied from 1/5 to 1/15 of the normal tape speed.

Variable resistor R010 located on the control panel changes the power supply voltage of the sawtooth-wave generator circuit (Q6) in the integrated circuit, which determines the signal amplitude of the sawtooth. In the sawtooth slicing circuit Q7 and Q8, the slicing level is held constant while the sawtooth signal level is varied so that the pulse width of the slicer output rectangular pulse is varied proportionally. This rectangular pulse output is again shaped into a sawtooth wave and routed to the pulse-width modulation circuit in the normal playback mode. However in slow-motion playback, the rectagular pulse output is first shaped into a sawtooth wave and then integrated by C703 to produce a dc voltage, which is fed to the capstan motor drive amplifier as the transistor bias voltage.

*Edit Mode*

Since the AV-3670ACE employs a capstan servo in addition to a drum servo, editing can be performed without any loss of servo control during the edit transition. The playback-mode servo is locked to the external video input that is used for editing, so that the playback CTL signal and video input vertical sync are in phase.

To put the VTR into the edit mode, the EDIT button is first pressed while in playback. Then C236 on the V3 Board is charged, and the mechanical

record link is unlocked at the same time. The RECORD button may then be pressed to start editing.

During the edit, drum-servo operation remains unchanged, the PG is compared with the VD input in both record and playback. However, the capstan phase servo used the playback CTL and 25 PG pulses in playback while it uses input VD and FG signals in record. This change is made smoothly in a fraction of a second without loss of servo.

Since the erase head is positioned to the left of the head drum, a few inches of tape are not erased. This portion of tape will contain a double recording and will produce a beat in the playback picture. In order to reduce the beat, the record current is boosted about 50% for two to four seconds after the recording is initiated.

## 2-3. VD FORMER

When the camera is connected and the VTR is set in the camera-record mode, the only VD signal is supplied from the VTR to the camera. The camera's horizontal circuit free-runs without trigger input.

The vertical drive signal is produced in the VTR by sampling the ac power line at the secondary winding of the power transformer. The 50 Hz sine wave is supplied to the SY3 Board where the positive half cycle is separated and amplified by Q901. The signal is then differentiated and again amplified by Q902 so that the VD pulse is produced to be supplied to the camera and to the servo circuit on the SV2 Board.

## 2-4. AUDIO CIRCUIT

Refer to Fig. 2-9 for the block diagram.

*Record Mode*

Audio input is amplified by Q501 and Q502 and supplied to the TV/CAMERA input select switch. The preamplifier output is fed to the AGC circuit and the level control R009. The AGC circuit, Q504 and Q505, is controlled by the peak rectified dc level. In the MANUAL mode, the signal level is controlled by R009 and indicates the peak rectified value on level meter. The output is amplified by the line amplifier Q506 and Q507 so that it is supplied to the audio output connector and record amplifier Q510. The Q510 output is mixed with the bias signal and then supplied to the audio record head. The bias oscillator Q513, oscillates at 90 kHz for record bias and erase signal.

*Playback Mode*

The playback signal is amplified by the equalizer amplifier Q501 and then by the subsequent line amplifier, before it is supplied to the output connector.

## 2-5. POWER SUPPLY CIRCUIT

A full-wave rectifier and voltage regulator circuit are connected in the secondary winding of the power transformer. 28 V dc is the regulated output voltage. There are another regulator circuit to supply 15 V dc and 9 V dc from the 28 V dc for capstan and the rf adaptor.

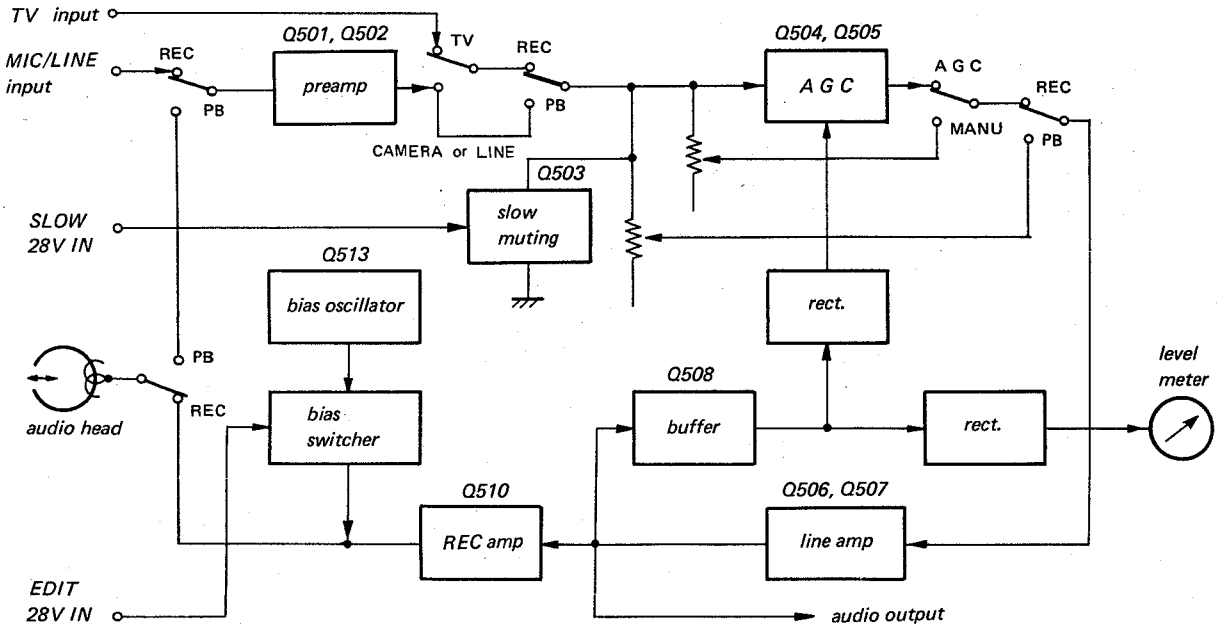



*Fig. 2-9. Audio circuit block diagram*

# SECTION 3
# DISASSEMBLY & POWER LINE FREQ. CHANGE

## 3-1. CABINET REMOVAL

1. Turn the VTR (with cabinet lid) upside down on a padded bench as shown in Fig. 3-1.
2. Remove the four Phillips-head screws from the bottom of the cabinet, as shown. Also remove the two Phillips-head screws on the side of the cabinet.
3. Lift off the cabinet.

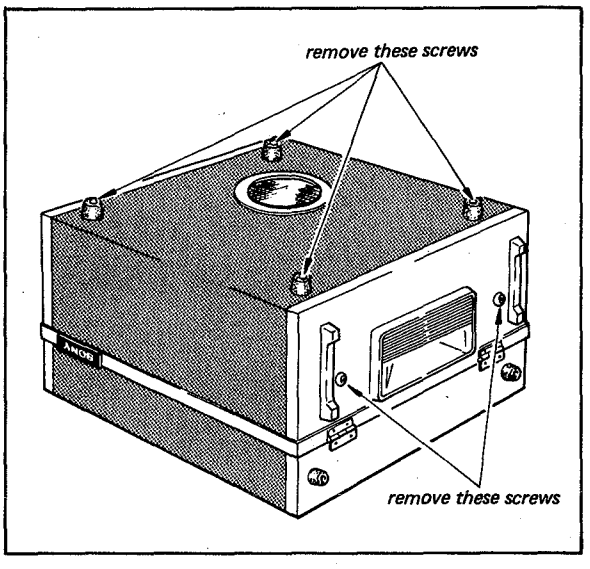



*Fig. 3-1. Cabinet removal*

## 3-2. CONTROL PANEL REMOVAL

1. Pull out the TRACKING control, AUDIO LEVEL control, VIDEO LEVEL control, SLOW SPEED control, INPUT SELECT switch and EXT SYNC switch knobs.
2. Loosen the one screw and remove the two screws on the Control Panel as shown in Fig. 3-2.
3. Lift off the Control Panel.

## 3-3. REEL PANEL REMOVAL

1. Pull out the SKEW control knob.
2. Loosen a screw at the back of the Head Cover. It is not necessary to remove this screw completely. Lift off the Head Cover.
3. Loosen the set screw in the Function Lever (Allen wrench. 0.1" across the flats). Pull off the lever.
4. Remove the screw securing the Drum Guard. Remove the Drum Guard.
5. Loosen a screw and remove the two screws on the Reel Panel as shown in Fig. 3-2.
6. Lift off the Reel Panel.

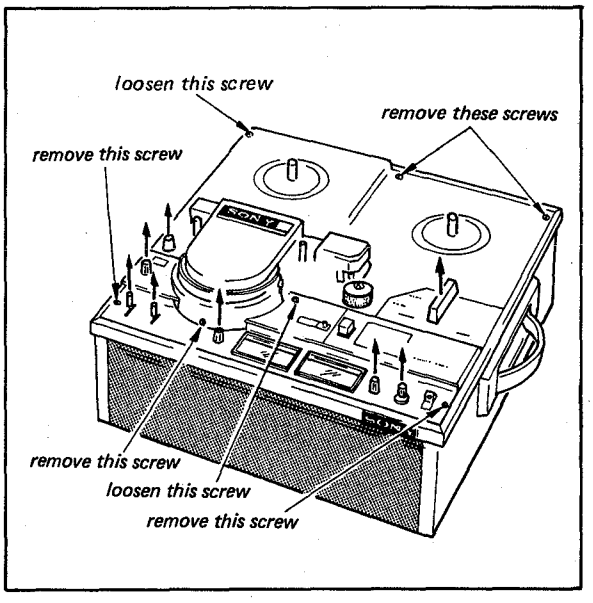



*Fig. 3-2. Removal of control and reel panels*

## 3-4. POWER LINE FREQUENCY CHANGE (to 60 Hz specifications machine)

The following items of replacements, changes and adjustment are necessary for the power line frequency change.

Replacements and Changes

(1) Drum pulley replacement
(2) Wiring change of C board
(3) SY board replacement (SY 3 to SY 7)

**Note:** The SY 3 board can be used only for 50 Hz. However, the replaced SY7 board can be used for both power line frequencies of 50 Hz or 60 Hz.

Proceed as follows;

(1) Drum pulley replacement

i) Remove the red coloured lead on the SV2 board from the brake coil

ii) Connect the frequency counter to TP-409 on the SV4 board.

iii) Select a suitable drum pulley among the pulleys shown in the table so that a counter reading of 39.68 ~ 39.54 msec (25.20 ~ 25.29 Hz) is obtained. Install the pulley. (Confirm that the power frequency is 60 Hz.)

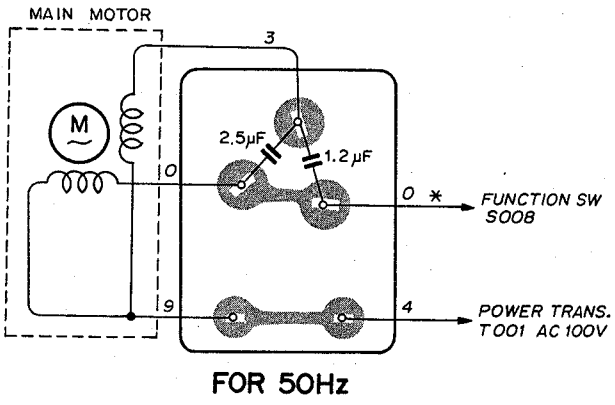
iv) Connect the lead removed in Step i.

| Parts No. | Mark | Diameter of Pulley |
|---|---|---|
| 3-625-622-01 | 60 | small ↑ |
| -11 | 61 | |
| -21 | 62 | |
| -31 | 63 | |
| -41 | 64 | |
| -51 | 65 | |
| -61 | 66 | |
| -71 | 67 | |
| -81 | 68 | ↓ large |

*Table 3-1.*

(2) Wiring change of C board

1. Unsolder the black lead marked by (*) in Fig. 3-3 (from function switch S008).
2. Connect the unsoldered black lead to the terminal shown in Fig. 3-3.
3. Cut the pattern (more than 2 mm) as shown in Fig. 3-3.



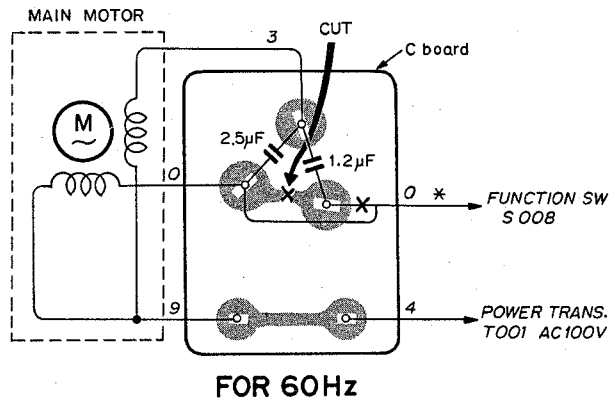




*Fig. 3-3.*

(3) SY board replacement (SY 3 to SY 7)

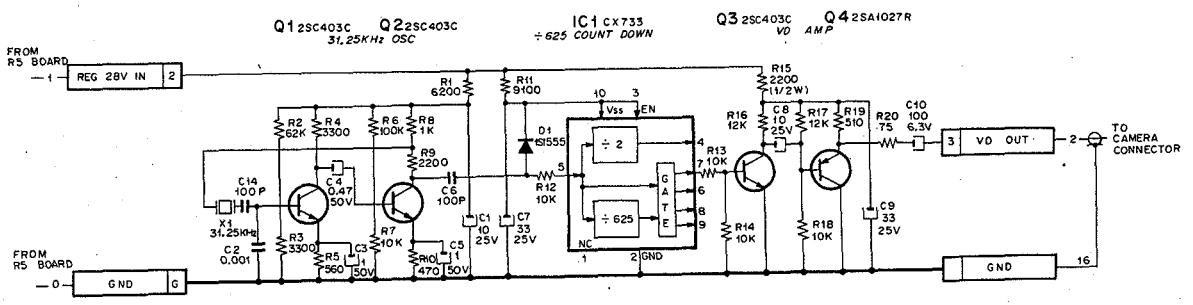
**Note:** This SY 7 board can be used for both power line frequencies of 50 Hz or 60 Hz.

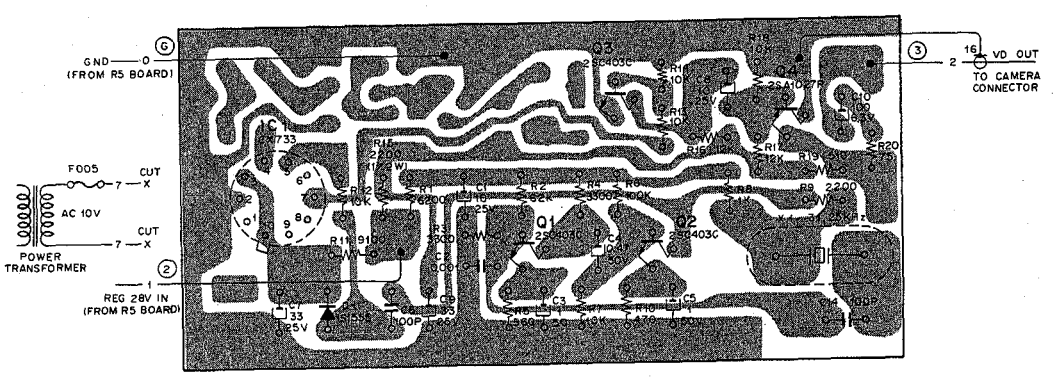
1. Prepare the components shown in the parts list.

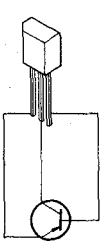
| Ref. No. | Parts No. | Description | | | |
|---|---|---|---|---|---|
| | 1-581-819-11 | SY 7 board | | | |
| C1106, C1114 | 1-107-085-00 | C, mica | 100pF | 5% | 50V |
| C1102 | 1-108-227-00 | C, mylar | 0.001μF | 10% | 50V |
| C1104 | 1-123-379-00 | C, elect | 0.47μF | | 50V |
| C1103, C1105 | 1-123-380-00 | C, elect | 1μF | | 50V |
| C1101, C1108 | 1-123-356-00 | C, elect | 10μF | | 50V |
| C1107, C1109 | 1-123-343-00 | C, elect | 33μF | | 25V |
| C1110 | 1-123-307-00 | C, elect | 100μF | | 6.3V |
| D1101 | 8-719-815-55 | Diode, | 1S1555 | | |
| IC1101 | 8-757-330-00 | IC, CX733, P-MOS | | | |
| Q1101, Q1102, Q1103 | 8-724-375-01 | Transistor, 2SC403C | | | |
| Q1104 | 8-729-612-77 | Transistor, 2SA1027R | | | |
| R1120 | 1-246-446-00 | R, carbon | 75 | 5% | ¼W |
| R1110 | 1-246-465-00 | R, carbon | 470 | 5% | ¼W |
| R1119 | 1-246-466-00 | R, carbon | 510 | 5% | ¼W |
| R1105 | 1-246-467-00 | R, carbon | 560 | 5% | ¼W |
| R1108 | 1-246-473-00 | R, carbon | 1K | 5% | ¼W |
| R1109 | 1-246-481-00 | R, carbon | 2.2K | 5% | ¼W |
| R1103, R1104 | 1-246-485-00 | R, carbon | 3.3K | 5% | ¼W |
| R1101 | 1-246-492-00 | R, carbon | 6.2K | 5% | ¼W |
| R1111 | 1-246-496-00 | R, carbon | 9.1K | 5% | ¼W |
| R1107, R1112, R1113, R1114, R1118 | 1-246-497-00 | R, carbon | 10K | 5% | ¼W |
| R1116, R1117 | 1-246-499-00 | R, carbon | 12K | 5% | ¼W |
| R1102 | 1-246-516-00 | R, carbon | 62K | 5% | ¼W |
| R1106 | 1-246-521-00 | R, carbon | 100K | 5% | ¼W |
| R1115 | 1-244-881-00 | R, carbon | 2.2K | 5% | ½W |
| X1101 | 1-527-259-00 | X'tal, 31.25 kHz | | | |

2. Mount the parts on the SY 7 board as indicated on the mounting diagram.
3. Two violet wires (AC10 V) from power transformer should be cut-off from SY 3 board and then taped to prevent shorting, because these wires will not be used for SY 7 board from machine.
4. Remove all the wires connection to the SY 3 and remove the SY 3 board from machine.
5. Install the SY 7 mounted board and connect lead wires as shown in the mounting diagram.

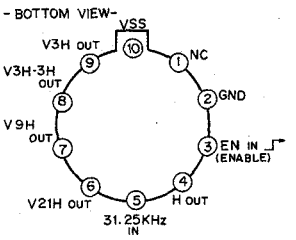
## SY-7 board

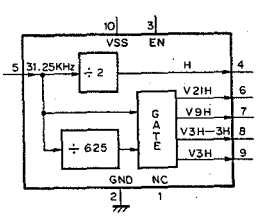


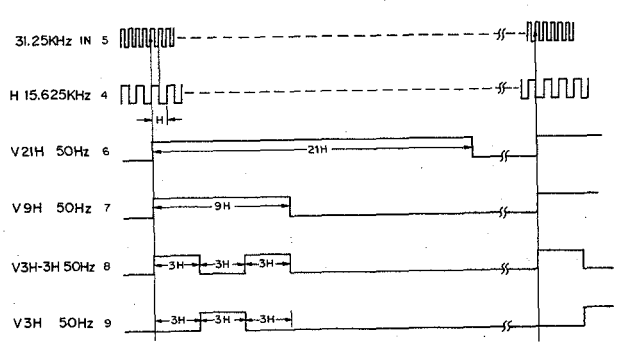




CX720 (SONY) VSS = +21 TO +26.5V
CX733 (SONY) VSS = +7.5 TO +15.0V
P-MOS 50Hz 625-LINE SYNC GENERATOR
- BOTTOM VIEW-



# SECTION 4
# MECHANICAL MAINTENANCE

## 4-1. PRECAUTIONS

Machine compatibility (interchangeability of tapes between machines) depends upon very close mechanical tolerances in the tape path. The tape path is factory-adjusted and should not require realignment under normal circumstances. Do not attempt adjustment of the tape guides or the tapered guides. If mechanical damage requires replacement and/or adjustment of the guides in the tape path, return the unit to a SONY FACTORY SERVICE CENTER for repair.

## 4-2. CLEANING HEADS AND SLIP RINGS

Noise in the picture during playback is usually caused by an accumulation of debris in the video heads. In some cases, half the picture may be noisy (split screen); in severe cases, video output may be lost. To clean the heads, stop the machine, remove the tape and move one of the heads to the cleaning position near the left tapered guide.

**CAUTION**

NEVER TRY TO CLEAN THE HEADS
WITH THE MOTOR RUNNING

Saturate a cleaning tip with SONY cleaning fluid or methanol. (Spray cleaner, such as M/S brand magnetic head cleaner, gives excellent results.)

Rub the cleaning tip across the head tip from side to side. Avoid vertical motion, which might damage the video head.

Clean the erase and audio/control heads with SONY cleaning fluid, if necessary. Move the cleaning tip vertically across that part of the head surface that normally contacts the tape.

Noisy slip rings cause intermittent dark horizontal lines in the playback picture. To clean the slip rings, remove the upper drum cover on the top of the rotary-head drum assembly. Remove the tape from the tape path.

Clean the slip rings directly with a dry cloth. Rotate the head assembly by hand to avoid contacting the brushes.

## 4-3. LUBRICATION

Four major lubrication points are:

1. Supply-Reel Table Bearing.
2. Take-up Reel Table Bearing.
3. Take-up Reel Idler Bearing.

To lubricate the reel table bearings, remove the screw and washer at the top of the spindle. Lift the reel table slightly so that the hollow shaft of the table rises above the spindle. Apply one or two drops of SONY oil, OL-1K, to the inner surface of the reel table shaft. Seat the reel table in its proper position and replace the screw and washers.

To lubricate the Take-Up Reel Idler, remove the Take-Up Idler Cap. Apply a drop of oil to the shaft of the idler. Wipe away excess oil from the rubber driving surfaces.

**Note:** A lack of oil on this part sometimes causes bearing noise in Play and Fast Forward modes.

## 4-4. DRIVE BELT REPLACEMENT

A worn or stretched drum drive belt results in excessive slippage and loss of servo control.

Check the belt by inspecting the inner (bearing) surface. Look for cracks and streaks along the long dimension of the belt. Replace the belt if it is badly scored along its length. To check belt length, remove the belt from the machine and compare its total length (flattened) with that of a new belt from stock.

To install the head-drum belt, stand the VTR on its left side. Loop the belt over the motor pulley, with the shiny side of the belt inside (against the pulley). Grasp the bottom of the loop, turn it one-half turn clockwise, and wrap around the pulley of the rotary head drum assembly.

Insert the belt separator between the two belts in the center of belt crossing point. Adjust the convex part on the discharge band cam to slightly contact the belt. See Fig. 4-1.

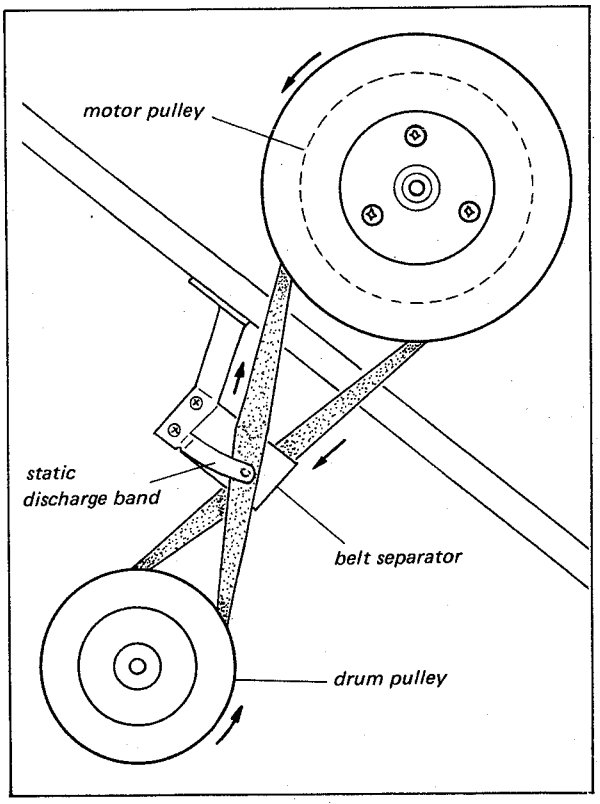



*Fig. 4-1. Drive belt installation*

## 4-5. VIDEO HEAD REPLACEMENT

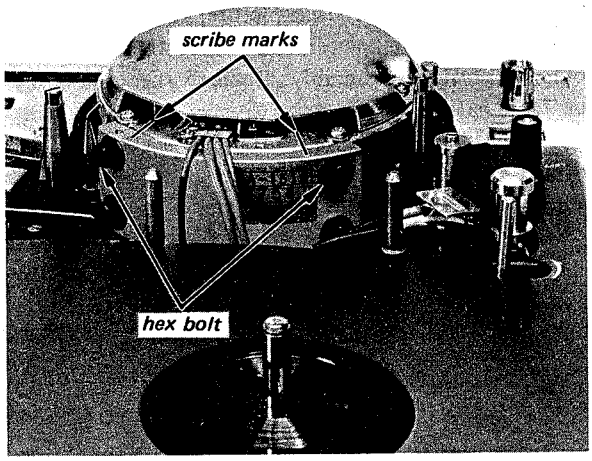
Video head replacement is required when the heads are damaged or have open coils. In addition, insufficient tape penetration resulting from head wear after long periods of operation may necessitate replacement. To remove and replace the rotary head assembly (the beam on which the two video heads and the slip rings are mounted), proceed as follows.

**CAUTION**

The video head assembly and the surrounding machined parts are very precisely made. Use utmost care when performing any work on the rotary head-drum assembly.

*Removal*

1. Turn off the power.Loosen the screw that holds the head-drum cover. Loosen only half a turn, do not try to back the screw all the way out. Lift off the head-drum cover.
2. Remove the two Phillips screws that hold down the cover plate. Loosen the brush pressure adjusting screws and remove the brush from the spring as shown in Fig. 4-5.
3. Put a reference mark on the upper drum using a scriber and straight edge as shown in Fig. 4-2.
4. Remove the two upper 5 x 20 hex-head bolts as shown in Fig. 4-2. and washers with a 5 mm Allen wrench. Hold the upper drum with one hand so that it does not fall as you withdraw the two screws.
5. Carefully lift the top of the drum assembly and fold it back. Place the drum top carefully on the reel panel.



**CAUTION**

Do not touch the PG pole pieces.

Position the rotary head platform by turning the aluminum beam on which the heads are mounted. Slight pressure on the pole pieces can affect pole piece alignment.

6. Hold the Video Head Assembly to keep the platform from rotating and loosen the two + P 4 x 8 screws that hold the head assembly to the platform. See Fig. 4-3. Do not put too much downward pressure on these screws; loosen the locking compound with Methyl Ethyl Ketone. Remove the screws and the washers.

7. Using both hands, carefully lift the Video Head Assembly off the platform.

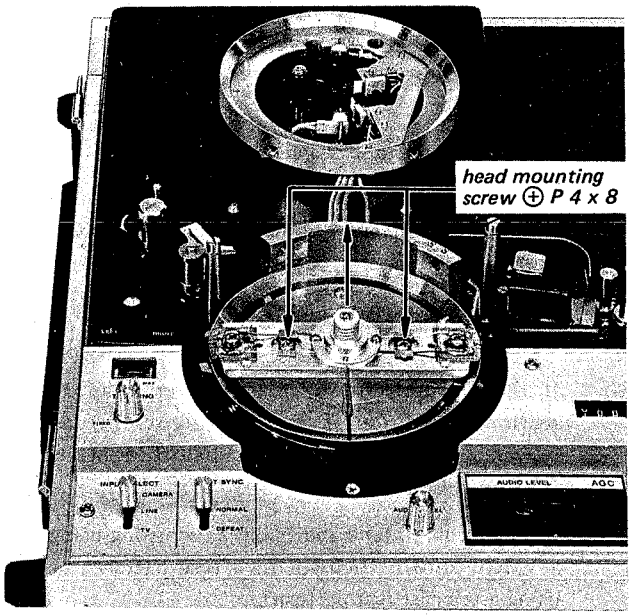



*Fig. 4-3. Removal of video head assembly*

*Replacement*

8. Clean the bottom of the new Video Head Assembly. Do not scratch or remove the spacer on the bottom of the Video Head Assembly.

9. Position the platform so that the 25 PG pole piece is at the 6 o'clock position.

10. Carefully place the Video Head Assembly on the platform with the B head (identified by the red paint) at the left. See Fig. 4-4.
The head assembly should fit down snugly against the platform without using force.

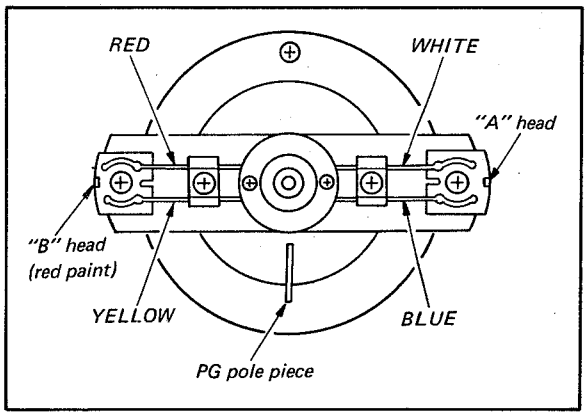



*Fig. 4-4. Position of the head assembly*

11. Install the two + P 4 x 8 screws and washers. Rotate the head assembly gently to the left and right until it is approximately in the center of the angular "play" permitted by the mounting screws. Tighten the screws alternately, applying torque gradually until the screws are tight.

12. Carefully swing the top of the Rotary Head Drum Assembly back into place. Support the top with one hand while inserting the two Hex Head bolts and washers. Do not tighten the screws all the way.

13. Grasp the top of the Rotary Head Drum Assembly and push it back and down against the drum holder so that top surface of the upper drum is even with that of the drum holder.

14. Tighten the two bolts alternately, applying torque gradually until both are tight.

15. Tighten the brush pressure adjusting screws to obtain a 1 mm bend (approximately) as shown in Fig. 4-6. Inspect the brush and slip-ring assembly to make sure that the brushes are centered in the slip rings.

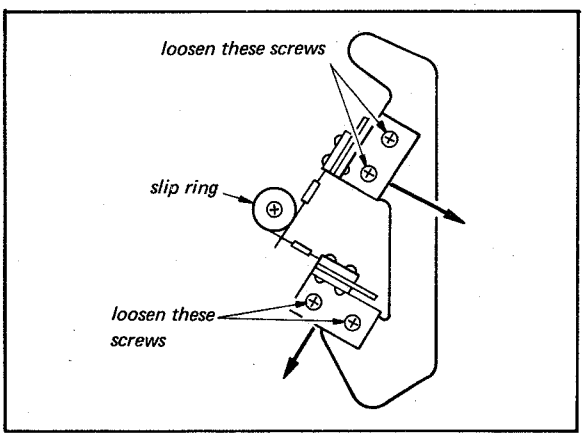



*Fig. 4-5. Preparation for video head replacement*

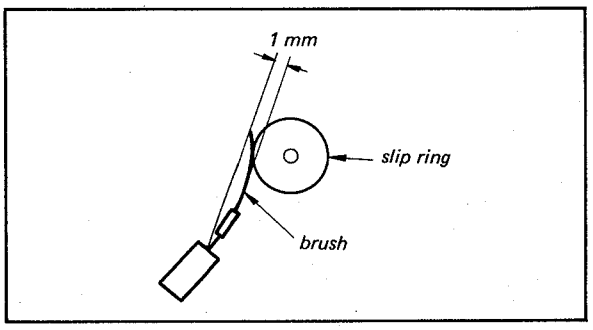



*Fig. 4-6.*

## 4-6. VIDEO HEAD DIHEDRAL ADJUSTMENT

Normally, if the video heads have been replaced according to the foregoing procedure, dihedral need not be adjusted. If the dihedral setting has been disturbed, however, or readjustment is otherwise indicated, proceed as follows.

The two video heads should be displaced exactly 180° apart measured at the head gap. If they are not, tape interchangeability can not be maintained. Video Head B (not A) should be adjusted so that it is correctly aligned with respect to Video Head A.

This adjustment requires the use of the SONY alignment Tape and the four adjusting screws shown in Fig. 4-7. The adjusting screw has a tapered head which bears against the base of the head when turned clockwise, thus forcing the head to move laterally. The thread of this screw is different from that of any conventional screw.

**CAUTION**

Do not use conventional screws for the dihedral adjustment as damage to the thread in the head beam will result. Adjusting screws for the video head are available for all AV-Series Videocorders.

*Proceed as follows:*

1. Thread a SONY Alignment Tape onto the Videocorder.
2. Play back the tape with a monitor connected.
3. Observe the picture on the monitor. (Do not use a monitor set for a short horizontal AFC time constant.) If the top of the picture is as shown by "A" in Fig. 4-8 (it appears as horizontal jitter), adjust Video Head B as follows.
4. Stop the Videocorder and remove the tape.
5. Position the B head so that the threaded adjusting-screw holes are accessible through the cutout in the upper drum. See Fig. 4-7
6. Install the adjusting screws into the threaded holes at either side of the head base until the tapered part just touches the head base.
7. Similarly, install adjusting screws into the two threaded holes at either side of the A head. These two screws serve only as weights to counterbalance the head-mounting beam.
8. Play back the tape and observe the top of the picture shown in Fig. 4-8.
9. Stop the Videocorder. Position Video Head B (indentified by red paint on the outer edge of the beam) to the adjusting position shown in Step 5.
10. First, loosen the (a) adjusting screw about a quarter turn counterclockwise and tighten the (b) adjusting screw a quarter turn clockwise. See Fig. 4-7.
11. Play back the tape. Check the picture on the monitor screen.
12. If the dihedral error does not change, repeat Steps 9, 10, and 11 until a change is visible.
13. If the dihedral error decreases, repeat Steps 9, 10, and 11 until a normal picture is obtained.
14. If the dihedral error increases, reverse the direction of rotation of the adjusting screws and repeat Steps 9 to 12 until the distortion in the picture is minimized.
15. Thread a blank tape and make a recording using a video camera focused on a test pattern (or using a telecast test pattern).

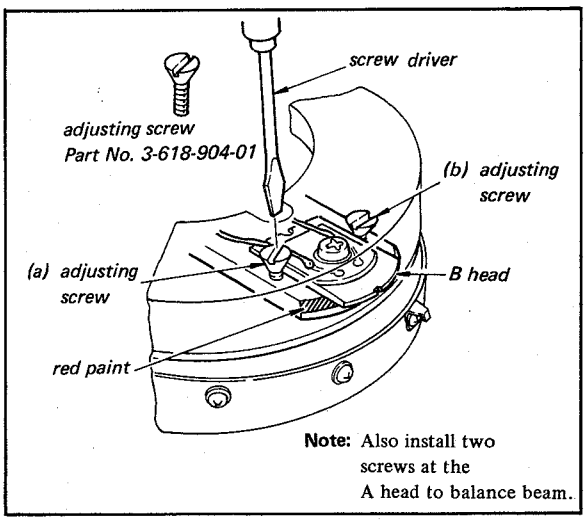



*Fig. 4-7. Video head dihedral adjustment*

16. Check the dihedral error in the picture and trim up the position of Video Head B as described in Steps 9 to 14.

17. Remove the four adjusting screws from the head assembly

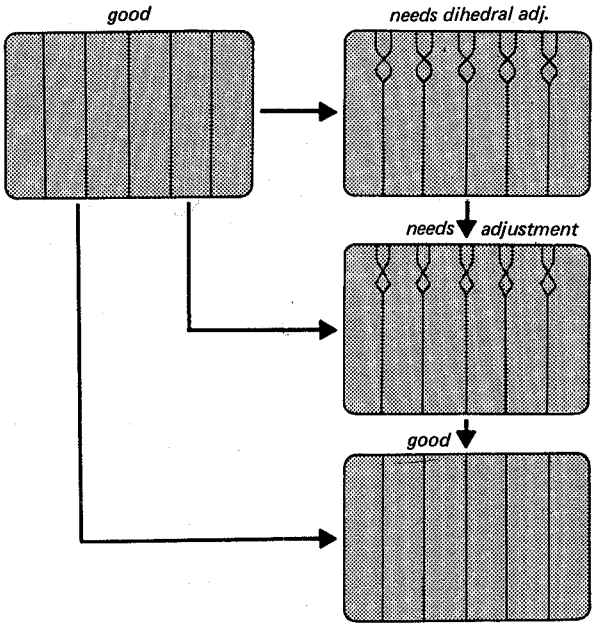



*Fig. 4-8. Head dihedral adjustment*

## 4-7. TAPE TENSION ADJUSTMENT

### 4-7-1. Tension Arm Adjustment

1. Clean any grease or debris from the Supply Reel Table and the Brake Band and check that the Brake Band surface is parallel to the Supply Reel Table and contacts evenly.

2. Set the Function Lever to the FORWARD position. Check the distance between the Tape Guide Pin on the Tension Arm and the extreme left edge of the drum deck as shown in Fig. 4-9. It should be about 1 mm. Swing the Brake Band as needed to obtain the correct spacing.

3. Check for clearance between the hole in the chassis and Item 1 shown in Fig. 4-9. If the correct clearance cannot be obtained, bend Part A with a pair of pliers to obtain the gap. (Don't bend it too much).

4. Check the distance between the rod and the Tension Arm as shown in Fig. 4-9. It should be 1~3 mm. Bend Part A with a pair of pliers to obtain the gap. (Don't bend it too much).

5. Set the Function Lever to the STOP position. Check the position of the Tape Guide Pin shown in Fig. 4-9. Reposition the Tension Arm Spring Bracket to obtain the correct position.

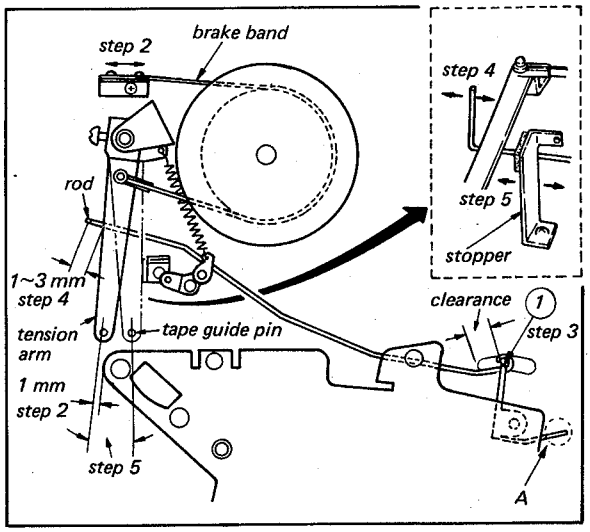



*Fig. 4-9. Tension arm adjustment*

### 4-7-2. Skew Release Adjustment

1. Verify that the SKEW control is set to neutral and set up the RECORD mode (the RECORD button stays locked).

2. Adjust screw so that the SC clutch plate is clear of boss by 0.5 to 1 mm.

3. Place the machine in the STOP mode and then turn the SKEW control fully clockwise.

4. Run the FUNCTION selector through all of its positions and verify that the SKEW control remains in the fully clockwise position.

5. Depress the RECORD button and verify that the SKEW control snaps back into the neutral position.

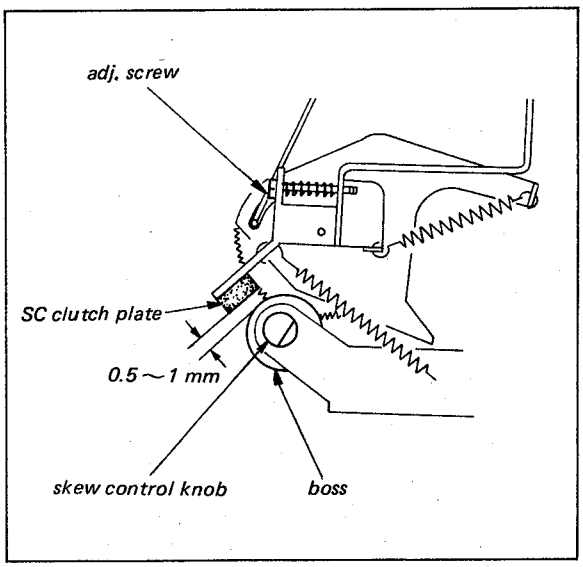



*Fig. 4-10. Skew release adjustment*

### 4-7-3. Tape Tension Adjustment

1. Place a reel containing 5 inches (diameter) of tape on the supply reel turntable. Set the FUNCTION selector to the FORWARD position and the SKEW control to neutral.
2. Make a loop in the tape and attach a spring scale as shown in Fig. 4-11.
3. Pull the scale in the direction indicated. A steady pull at approximately the correct tape speed should give a reading of 40 to 45 grams. Verify that the reading is within these limits.
4. If the reading is outside the 40 ~ 45 gram limits, adjust the tape tension adjustment screw (see Fig. 4-11) to bring it within specification.

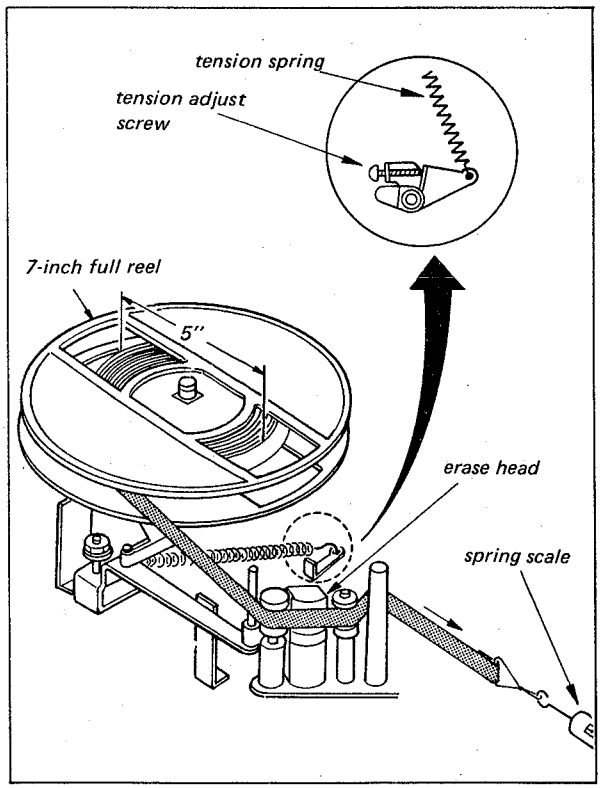



*Fig. 4-11. Tape tension adjustment*

## 4-8. REEL TABLE HEIGHT ADJUSTMENT

1. Run a tape in the FORWARD mode.
2. Check both reels to see that tape does not rub against the edges of the reels.
3. If the tape is not centered in either reel, adjust reel height by adding or removing the fiber washers (Thrust Bearing Washers, Parts Number 3-005-074-51, -52, -53) beneath the reel-table assembly.

## 4-9. COMBINATION HEAD REPLACEMENT

A malfunctioning combination head can be replaced, without disturbing servo tracking, by the following procedure:

1. Unsolder the leads at the rear of the combination head.
2. Remove screws Ⓐ and Ⓑ in Fig. 4-12. Do not remove screws Ⓒ. Be sure not to lose the spring under screw Ⓐ.
3. Remove the defective head ass'y from the head base. See Fig. 4-13. Also remove screws Ⓓ and Ⓔ, shown in Fig. 4-13.
4. Install the new head ass'y by reversing the order of the disassembly outlined above.
5. When the new head ass'y is installed, turn screw Ⓐ until it is tight. Adjust screw Ⓑ so that the head gaps appear (by eye) to be perpendicular to the deck.
6. Play a tape and check that the core of the head extends an equal amount above and below the edges of the tape. See Fig. 4-14. Adjust height and tilt screws Ⓓ and Ⓔ as necessary until this condition is achieved.
7. Terminate the LINE OUT connector with a 100k ohm load and connect an AC VTVM across this load.
8. Play back the 7 kHz segment of a SONY alighnment tape and adjust the azimuth screw Ⓑ and the tilt screw Ⓔ for maximum output as indicated on the VTVM (maximum output at 7 kHz).
9. Check the audio bias current adjust.

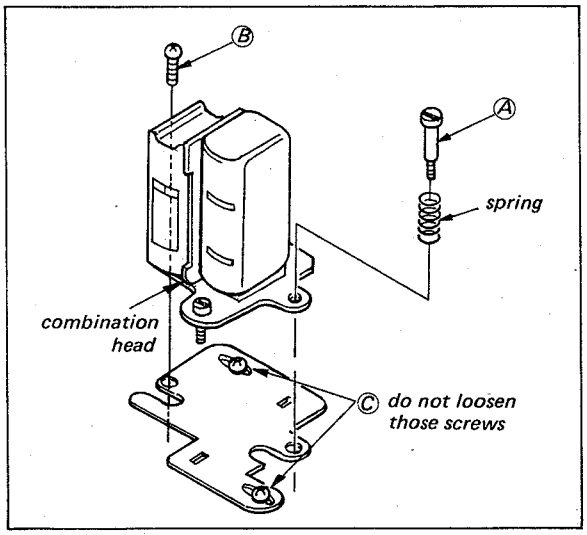



*Fig. 4-12. Combination head replacement*

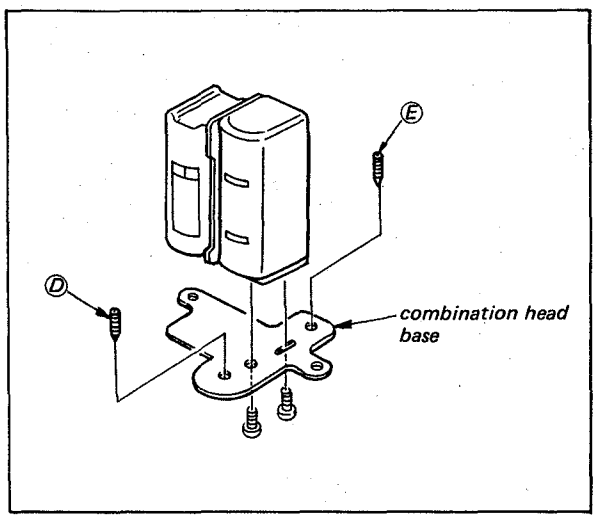



*Fig. 4-13. Combination head replacement*

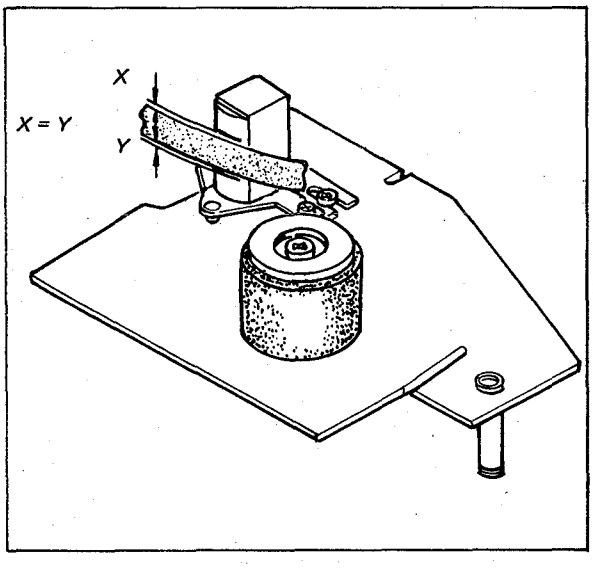



*Fig. 4-14. Combination head height check*

## 4-10. TAKE-UP IDLER HEIGHT ADJUSTMENT

1. Set the Function Lever to the FAST FORWARD position. The Take-Up Idler should be lifted by the Take-Up Cam. Make sure that the lower surfaces of the Take-Up Idler and the Take-Up Reel Table (lower) are in line or that the lower surface of the Take-Up Idler is slightly higher.

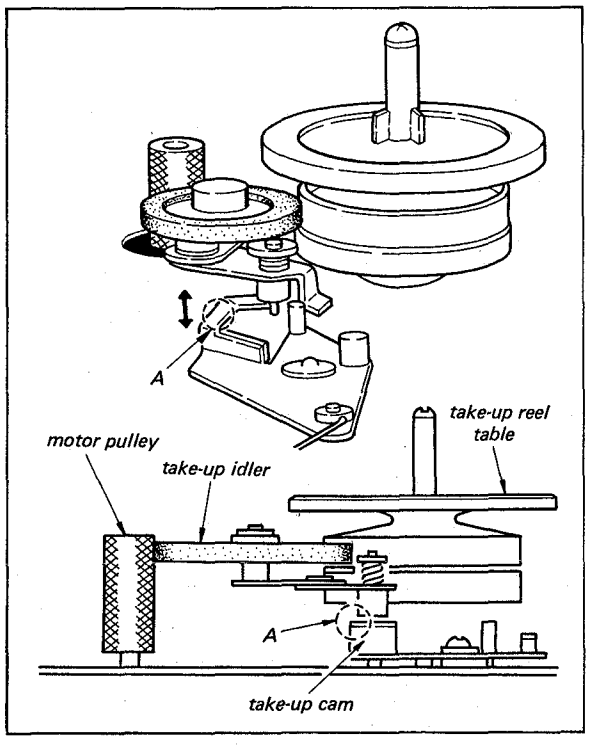



*Fig. 4-15. Take-up idler height adjustment*

2. If this condition does not exist, place the Function Lever in the FORWARD position. Bend Finger A with a pair of pliers as shown in Fig. 4-15 to obtain the correct Take-Up Idler height.

## 4-11. REWIND IDLER REPLACEMENT

### 4-11-1. Rewind Idler Replacement

1. Check the Rewind Idlers if the machine is noisy or does not wind up tape smoothly and rapidly during rewind, or if the Supply Reel is not braked properly when going from FORWARD to STOP.
2. Inspect the driving surfaces of both Rewind Idlers for excessive or uneven wear. Inspect the driving surface of the Supply Reel Assembly. Clean away any oil or debris from all driving surfaces.
3. Set the Function Lever to STOP. Check that the Right Rewind Idler is clear of the Idler Stopper by 1 to 2 mm. See Fig. 4-16. If this condition does not exist, bend the Idler Stopper with a pair of pliers.
4. Check that the contacting surfaces of the Right and Left Rewind Idlers are parallel. If they are not, bend them by hand.
5. Check that the Supply Reel Table, Left Rewind Idler, and Right Rewind Idler are contacting securely. Make sure at this time that the Right Rewind Idler is disengaged from the Take-Up Reel Table by more than 1 mm.
6. To replace the Rewind Idlers proceed as follows.
7. Set the Function Lever to FORWARD. Pry the Retaining Ring (E5) from the top of the Left Rewind Idler shaft using a screwdriver. Remove the fiber washer. Lift the Left Rewind Idler off its shaft. The directional brake will spring back counterclockwise when the idler is removed.
8. Place one drop of oil on the idler shaft. Rotate the directional brake clockwise until the point faces to the right (3 o'clock). Position the idler shaft so that the idler can be dropped onto the shaft. (Before dropping the idler, identify its top and bottom so that it is installed correct side up.) Release the directional brake. Install the fiber washer and Retaining Ring (E5).
9. Pry the Retaining Ring (E5) from the top of the Right Rewind Idler. Remove the fiber washer and push rod. Lift the Right Rewind Idler off its shaft.
10. Place a drop of oil on the shaft of the Right Rewind Idler. Install the Right Rewind Idler, the fiber washer, the push rod, and the Retaining Ring, in that order.

### 4-11-2. Rewind Idler Adjustment

1. Set the Function Lever to STOP. Check that the Right Rewind Idler is clear of the Idler Stopper by 1 to 2 mm. See Fig. 4-16.
2. Set the Function Lever to STOP. Check that the Supply Reel Table, Left Rewind Idler and Right Rewind Idler are contacting securely.
3. Set the Function Lever to STOP. Check for a clearance of 2 to 2.5 mm between the Rewind Idler and the Motor Pulley.

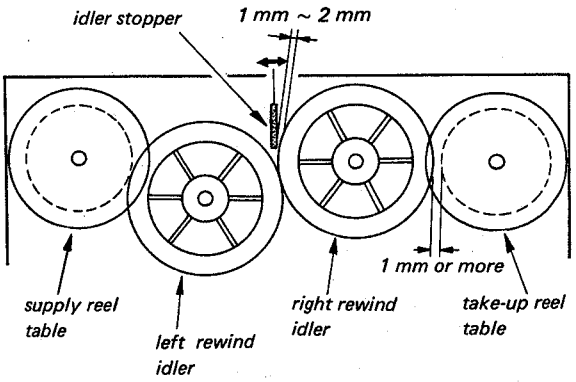



*Fig. 4-16. Rewind idler adjustment*

## 4-12. BRAKE TORQUE ADJUSTMENT

1. Set the Function Lever to STOP. Place an empty reel with several turns of string wrapped around the hub onto the Supply Reel Table as shown in Fig. 4-17. Attach the string to the spring scale. Pull the scale at a speed of approximately 19 cm/sec. Check the reading for brake torque. It should be more than 800 g-cm.
2. Repeat the above brake-torque checks for B, C, and D as indicated in Fig. 4-17. The brake torques should be less than 400 g-cm for the direction of B and C and more than 800 g-cm for the direction of D.
3. Bend Spring Supporting Brackets ① and ② with a pair of pliers, if necessary, to obtain the correct brake torques.
4. Set the Function Lever to PAUSE. Repeat the procedure described in Step 2 for the direction indicated by E in Fig. 4-17. It should be more than 800 g-cm.

5. If necessary, bend the portion of the Pause Brake Lever identified by ③ with a pair of pliers.

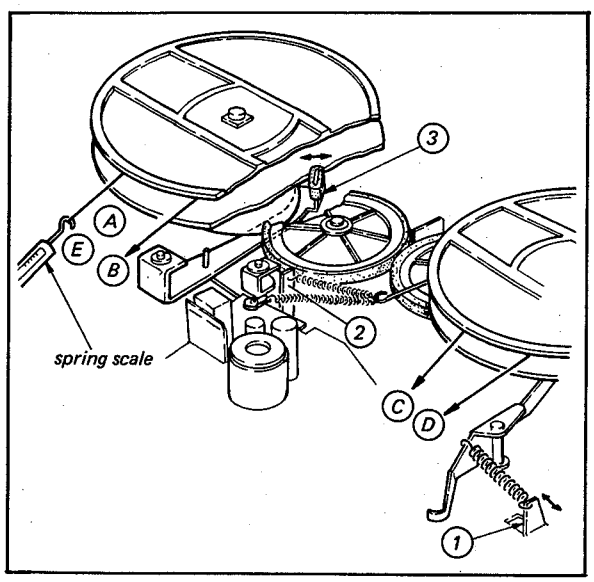



*Fig. 4-17. Brake torque adjustment*

## 4-13. BRAKE-SYSTEM ADJUSTMENT

### 4-13-1. Take-Up Brake Lever Check

1. Set the Function Lever to STOP. Check that the top end of the Brake Lever is disengaged from the Function Selector Cam by approximately 0.5 ~ 1.5 mm. Refer to Fig. 4-18.

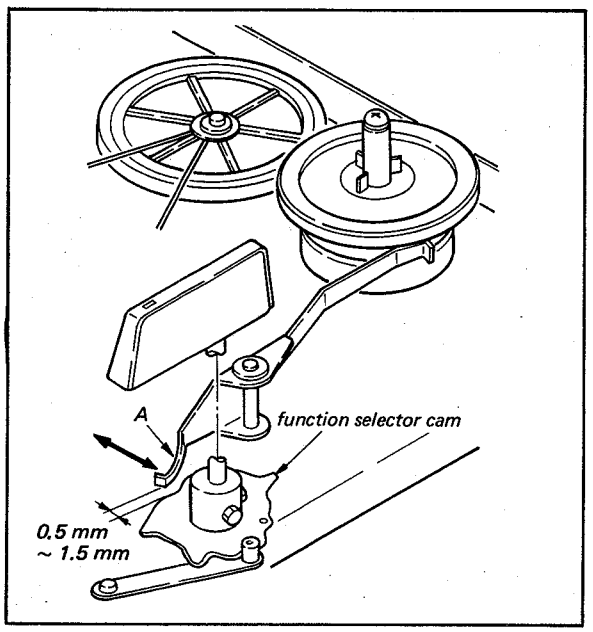



*Fig. 4-18. Take-up brake lever check*

2. Set the Function Lever to REWIND. Check for a clearance of approximately 2 mm ~ 5 mm between the Brake Lever and the Take-Up Reel Table. Refer to Fig. 4-19.

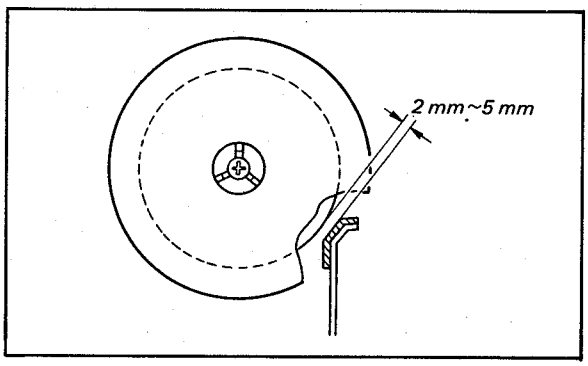



*Fig. 4-19. Take-up brake lever check*

### 4-13-2. Pause Brake Lever Check

1. Set the Function Lever to REWIND. Check for a clearance of approximately 1 mm between the Pause Brake Lever and the Supply Reel Table.
2. If this condition does not exist, turn nut "A" and adjust the Rod Stopper shown in Fig. 4-20.
3. Advance the tape. Check that the tape stops running in the PAUSE mode.
4. In the PAUSE mode, check for play between the Brake Lever and the Rod Stopper.
5. Check that the Brake does not work in other modes except the PAUSE mode.

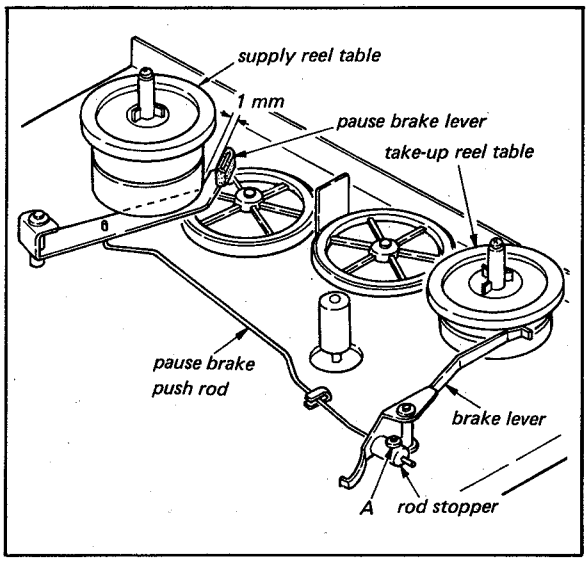



*Fig. 4-20. Rewind idler replacement*

### 4-13-3. Brake Timing Adjustment

1. Set the Function Lever to STOP. Check for a 2 ~ 2.5 mm clearance between the Motor Pulley and the Right Rewind Idler.
2. Bend the Take-Up Cam Push Rod a with a pair of pliers as needed to obtain the correct spacing. See Fig. 4-21.
3. Move the Function Lever from REWIND to STOP very slowly. Check that Take-Up Reel Table braking is applied before the Right Rewind Idler stops rotating.
4. Move the Function Lever from FAST FORWARD to PAUSE very slowly. Check that Supply Reel Table braking is applied before the Take-Up Reel Table stops running. If adjustment in Step 3 or 4 is necessary, refer to "MICRO-SWITCH MAINTENANCE AND ADJUSTMENT" Section 4-22.
5. Thread a tape on the VTR and advance it until all the tape is on the Take-Up Reel. Move the Function Lever from REWIND to STOP. Check that the tape stops without excess slack. If there is too much slack in the tape, bend the Brake Lever with a pair of pliers. There should still be at least 0.5 mm clearance between the Brake Lever and the Take-Up Reel Table.
6. Place a full reel of tape on the Supply Reel Table. Move the Function Lever from FAST FORWARD to PAUSE. Bend the Pause Brake Lever with a pair of pliers. Refer to "Pause Brake Lever Check", Section 4-13-2.

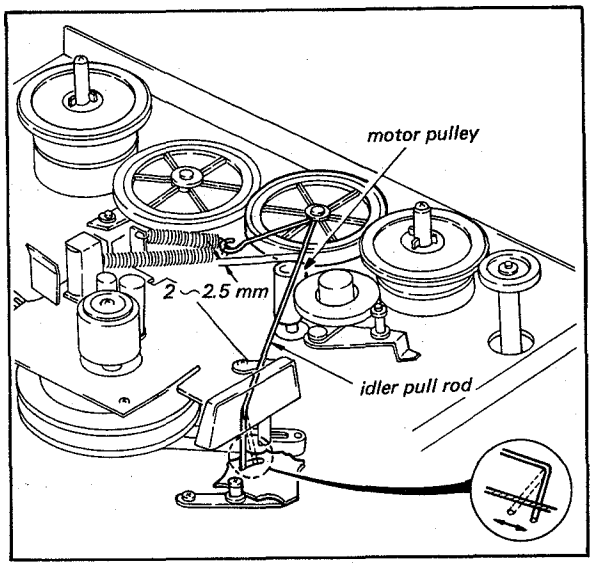



*Fig. 4-21. Brake timing adjustment*

## 4-14. MOTOR REPLACEMENT

### 4-14-1. Drum Motor Replacement

If the motor is suspected to be defective, check the mechanical load on the motor to make sure that the Capstan and Rotary Head Drum Assembly turn freely. Check for line voltage between the black and white leads of the motor (set the Function Lever to FORWARD). Also check phasing capacitor C001 in series with the green lead of the motor as follows.

1. Remove the drive belt for the Rotary Head Drum Assembly.
2. Loosen the set screw in the lower drive pulley and remove the drive pulley and fan.
3. Hold the motor with one hand and back out the four Phillips-head screws from the top of the chassis.
4. Remove the upper (knurled) drive pulley from the top of the motor shaft.
5. Note the position of the hum belt (the steel band that surrounds the motor), Loosen the two screws that apply tension to the hum belt and remove the belt.
6. Install the hum belt on the new motor. Position the mounting screws as shown in Fig. 4-22. Make sure that the hum belt straddles the two end bells equally.
7. Install the top (knurled) drive pulley on the upper motor shaft. Space the bottom edge of the pulley about 4 mm from the top of the motor as shown in Fig. 4-23.
8. Put the motor in place. Solder the motor leads.
9. Install the Rotary Head Drum drive belt.
10. Energize the motor and check FORWARD, FAST FORWARD, and REWIND operations. Check the running position of the lower drive belt.

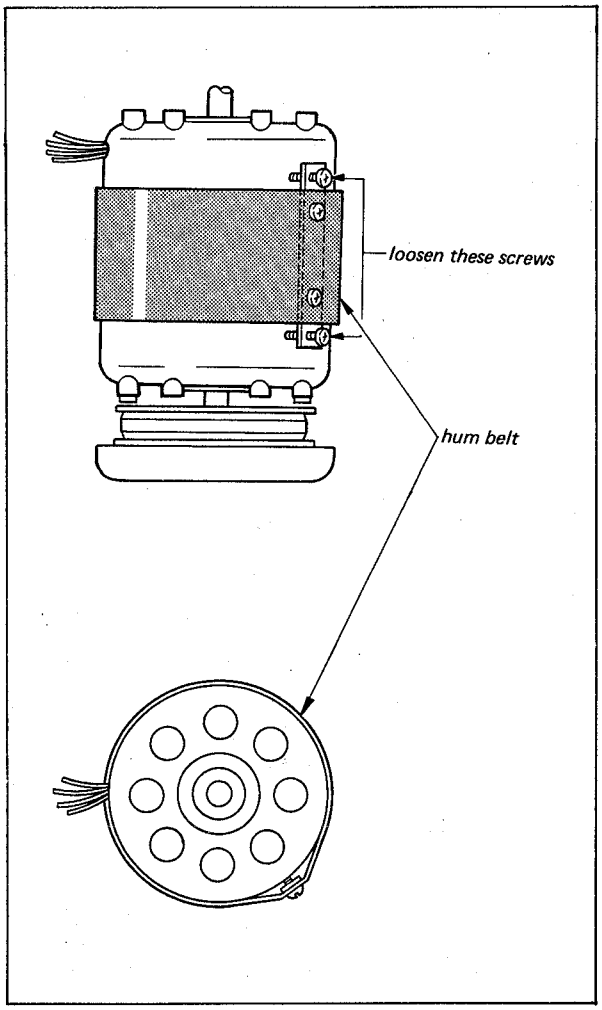



*Fig. 4-22. Hum belt replacement*

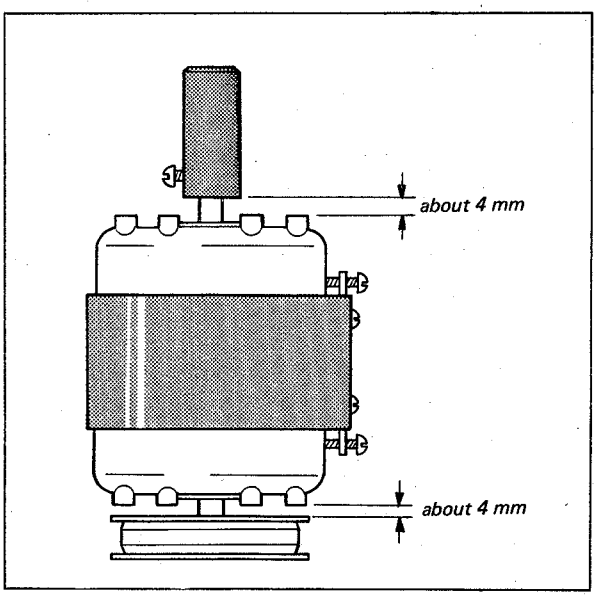



*Fig. 4-23.*

### 4-14-2. Capstan Motor Replacement

1. Cut the motor leads.
2. Hold the motor with one hand and back out the three screws. Remove the Capstan Motor.
3. Remove the Capstan Pulley and three collars on the Capstan motor.
4. Install the capstan pulley and the three mounting collars on the new motor. Space the bottom edge of the pulley 4.5 mm from the collar. See Fig. 4-24.
5. Install the new motor and solder the motor leads to the proper tie points.
6. Energizes the motor and check the operation of the Capstan Belt.
7. Adjust "Capstan Free Running Speed" as directed in Section 6-2-1.

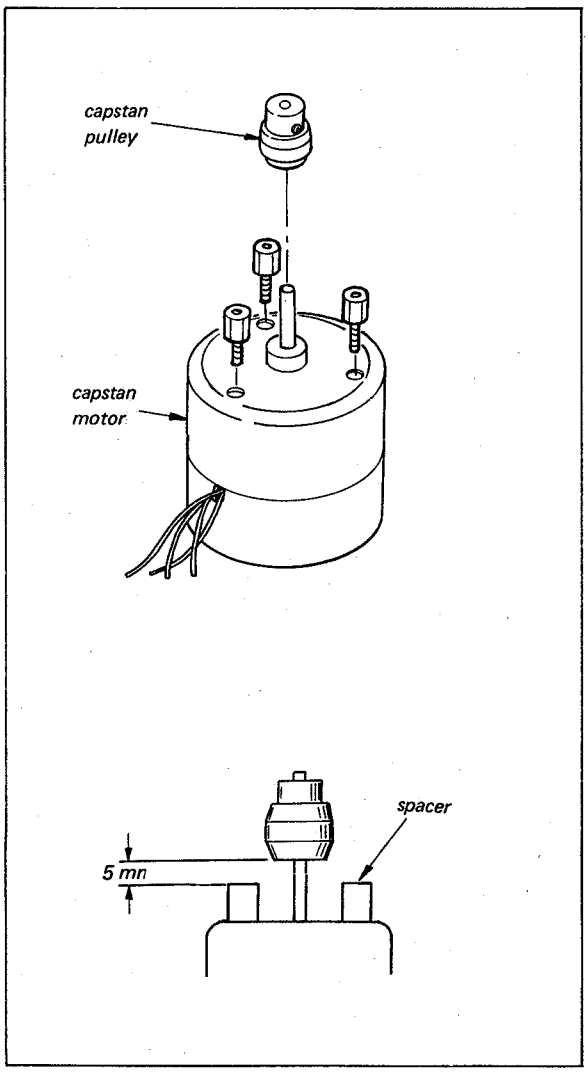



*Fig. 4-24.*

## 4-15. RECORD BUTTON AND SLOW SWITCH ADJUSTMENT

1. Check that the RECORD and SOUND DUB buttons can be pushed and locked only in the STOP and PAUSE modes.

2. If the latch does not operate correctly, proceed as follows. In the STOP mode, make sure that the Edit button is clear of the Set Lock Bar. Clearance should be between 0.1 mm and 0.3 mm Refer to Fig. 4-25. Bend Section A with a pair of pliers as needed to obtain the correct spacing.

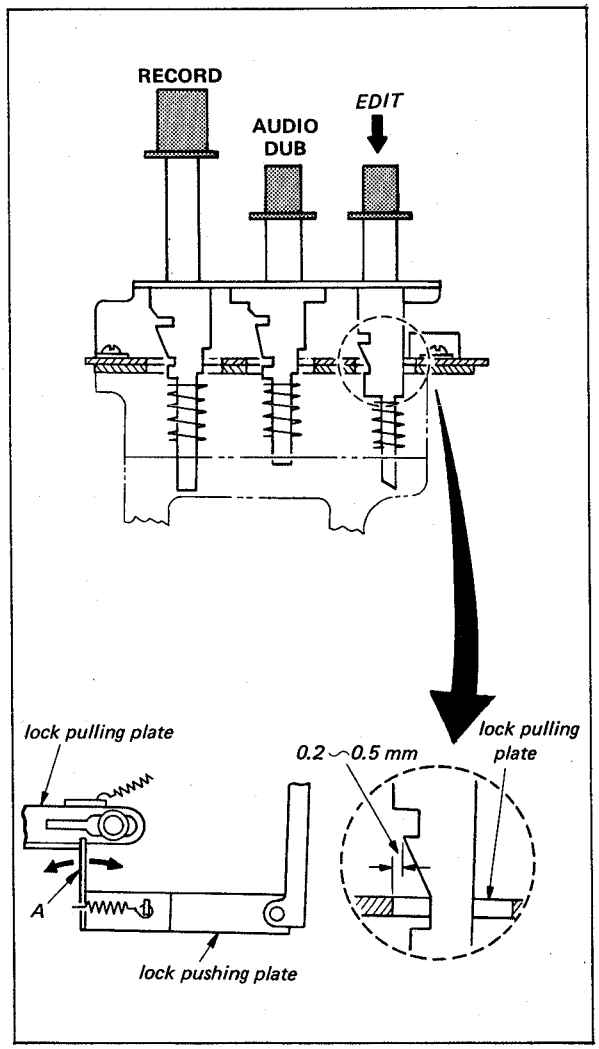



*Fig. 4-25.*

3. In the STOP mode, check that the SLOW button can be pulled, locked, and released when the RECORD or SOUND DUB button is pressed.

4. If the above condition does not exist, bend Section A with a pair of pliers for adjustment. Refer to Fig. 4-26. The reel panel and the sash should be removed before adjustment.

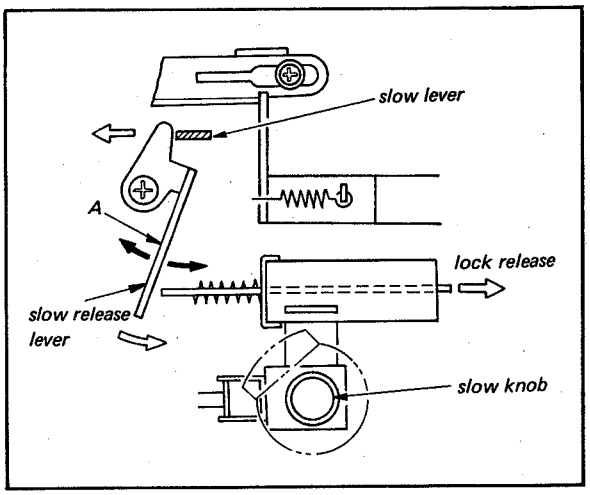



*Fig. 4-26.*

5. Check that the following buttons can be operated correctly in the FORWARD mode as follows.

   (1) The SLOW button can be pulled and locked.

   (2) The SLOW button can be released when either the RECORD or SOUND DUB button is pressed after the EDIT button is pressed.

   (3) The SLOW button can not be locked when the RECORD button has been pressed and locked.

## 4-16. RECORD BUTTON LATCH LINKAGE ADJUSTMENT

1. Push the RECORD button. Check that the slide switches on the V3, A2, and SV4 circuit borads are actuated.

2. Push the AUDIO DUB button. Check that the slide switch on the A2 circuit board is actuated. Refer to Fig. 4-27.

3. If the switches do not operate correctly, check for 2 mm clearance (or less) between Slide Plate A and the split nut with the AUDIO DUB button released.

4. Adjust the Rod Stopper of the Slide Switch Lever C to adjust the stroke of Slide Plate B when the RECORD button is pressed in the STOP mode. If necessary, bend the Slide Switch Lever with a pair of pliers.

5. Adjust the Slide Switch Springs if necessary until the clearance between the ends of the slide switches on V3, A2, and SV4 circuit boards and the Slide Switch Spring D, E, and F is approximately 1 mm.

6. Actuate and release the RECORD and AUDIO DUB buttons a few times. Check that the slide switches operate correctly.

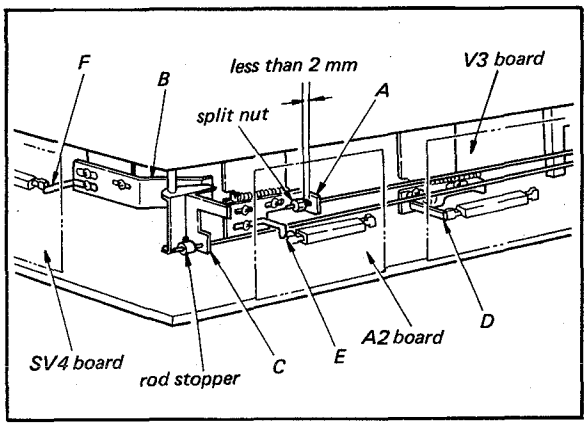



*Fig. 4-27. Record button latching adjustment*

## 4-17. AUTOMATIC SHUTOFF SWITCH ADJUSTMENT

To check the operation of the Automatic Shut-Off Switch, turn on the power and proceed as follows.

1. Remove the tape from the normal tape path. Set the function lever first to FORWARD, then to PAUSE, FAST FORWARD, and REWIND. The motor should shut off in each position after about 1 second. Repeat this check with tape threaded properly. The motor should remain on when the function lever is set to FORWARD, PAUSE, FAST FORWARD, and REWIND.

2. Set the function lever to STOP, and depress the RECORD button. The motor should turn on.

3. Thread the tape on the VTR. Make sure that the motor is not shut off by a slight overshoot of the tape sensing wire ①. If the aforementioned conditions are not met, proceed to the following steps.

a) Bend the Ⓐ section so that the top end of the actuator is clear of the tape's running surface by 4.5 to 8 mm in the FORWARD operating mode. See Fig. 4-28.

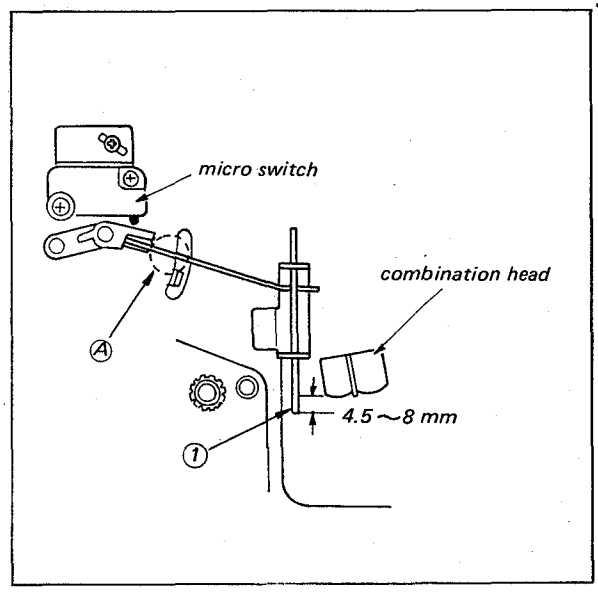



*Fig. 4-28. Automatic shutoff actuator adjustment*

b) Bend the lower part Ⓑ of the actuator so that the top end of the actuator is 4 to 8 mm apart from the tape's running surface in the STOP mode. See Fig. 4-29.

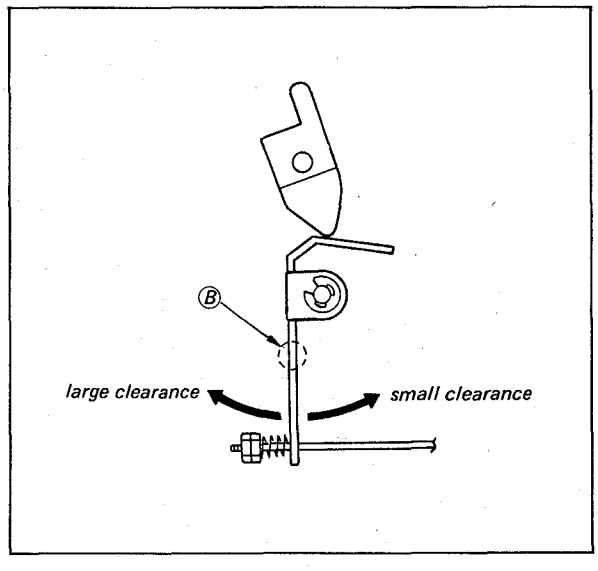



*Fig. 4-29. Automatic shutoff actuator adjustment*

## 4-18. CAPSTAN DECK ASSEMBLY ADJUSTMENT

1. Set the function lever to FORWARD. Check that the clearance between the pinch lever and the function selector cam is 0.5 to 1 mm. If necessary, readjust the position of the capstan deck ass'y. See Fig. 4-30.

2. Set the function lever to PAUSE. Make sure that the clearance between the capstan shaft and the pinch roller is more than 0.3 mm. If necessary, recheck Step 1. See Fig. 4-31.

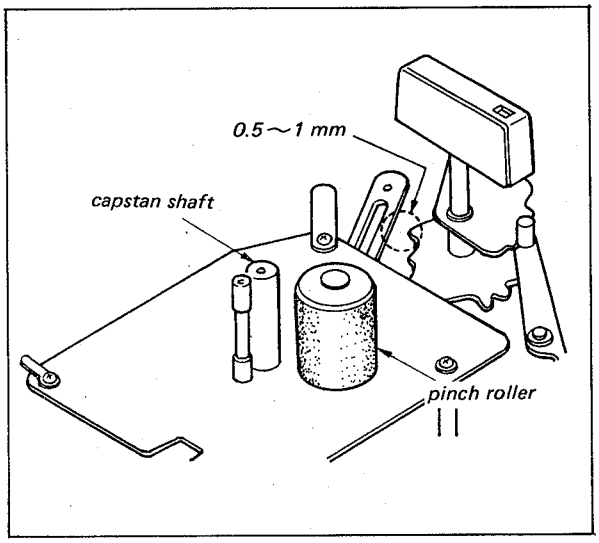



*Fig. 4-30. Capstan deck adjustment*

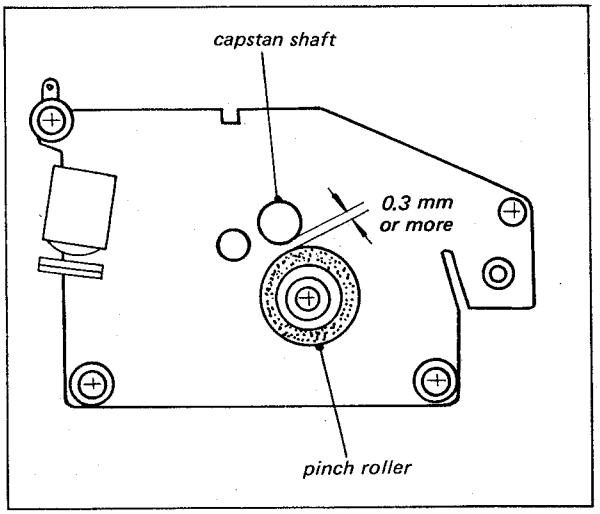



*Fig. 4-31. Capstan deck adjustment*

## 4-19. PINCH ROLLER PRESSURE ADJUSTMENT

1. Set the FUNCTION selector to FORWARD. Make a loop in a piece of string and loop the string around the base of the pinch roller shaft. See Fig. 4-32. Attach the spring scale to the loop of string and pull the scale in the direction indicated by the arrow.

2. Check the reading on the spring scale at the point where the pinch roller just leaves the capstan shaft. Verify that it is between 1.5 and 2.6 kg. If it is out of specification, replace the pinch roller pressure spring.

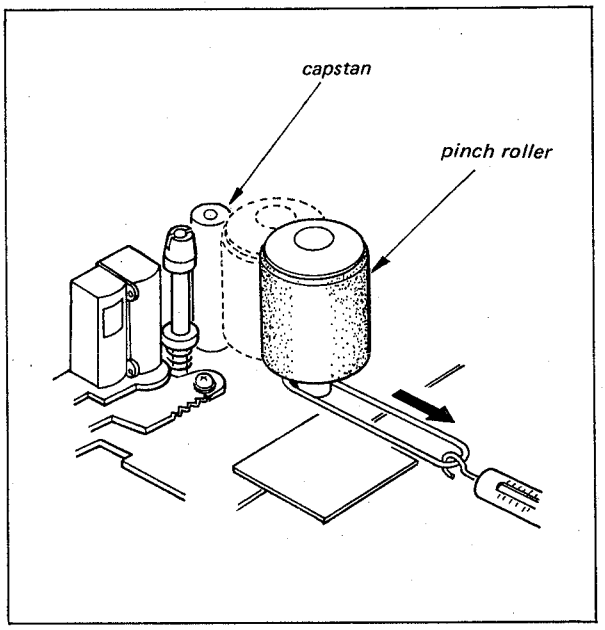



*Fig. 4-32. Pinch roller pressure test*

## 4-20. MICRO SWITCH MAINTENANCE AND ADJUSTMENT

1. Set the Function Lever to the STOP mode. Make sure that the microswitch actuator is in the center of the Cam. See Fig. 4-33.

   **Note:** The microswitch turns off when the actuator is pressed.

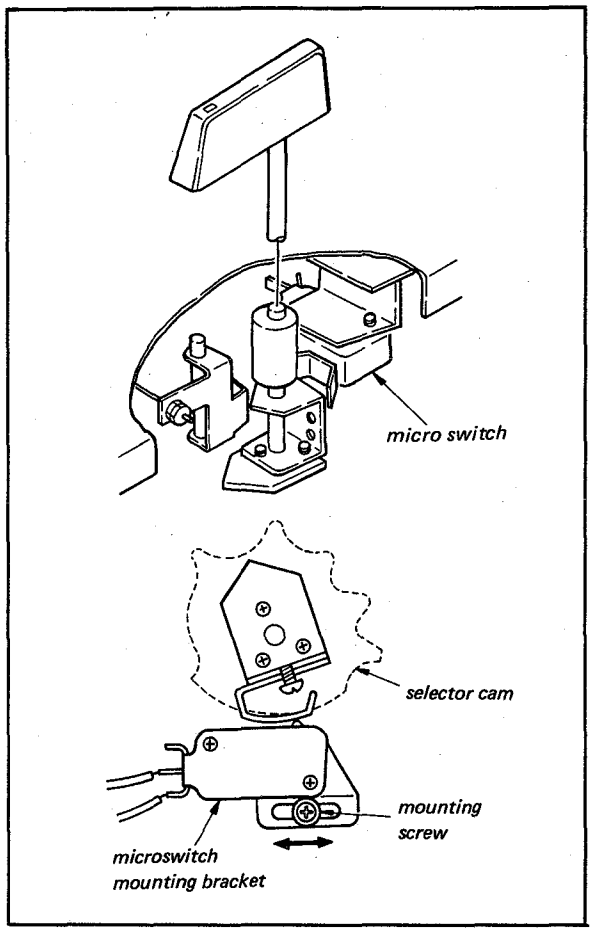



*Fig. 4-33. Microswitch adjustment*

2. Check that the microswitch turns on in the FORWARD mode.
3. If it does no operate normally, loosen the mounting screw and readjust the position of the Microswitch Assembly within the slot of the Microswitch Mounting Bracket. After adjustment, apply a suitable locking compound to the mounting screw.
4. Coat the Cam contacting surface with grease.

## 4-21. BELT SEPARATOR ADJUSTMENT

The belt separator prevents electrical noise by grounding static electricity built up due to contact friction between the belt and pulleys.

1. The belt separator should be situated so that in its free standing position it fits naturally between the belt surfaces at the crossover point. See Fig. 4-34.
2. Rotate the motor fan a few times to center the belt on the pulleys. Adjust the position of the static discharge plate so that its extruded convex surface lightly rides the middle of the drum belt.

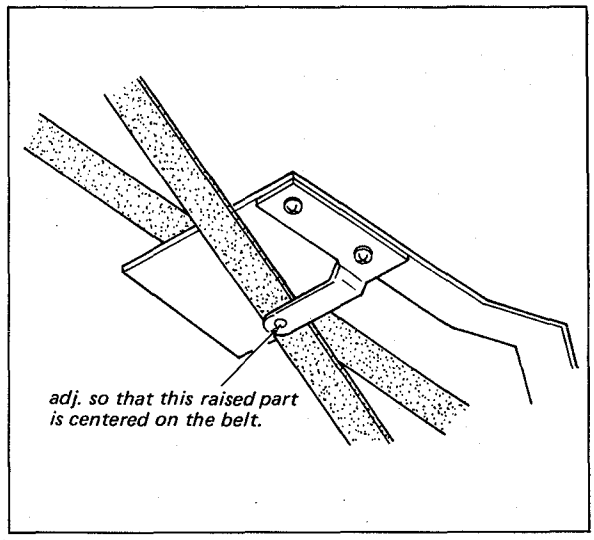



*Fig. 4-34. Belt separator adjustment*

# SECTION 5
# POWER SUPPLY ALIGNMENT

### 5-1. +28 V SETTING

Connect a voltmeter to the positive terminal of C604 and ground on the R5 Board and adjust R604 for +28 V ±0.5V.

### 5-2. +9 V SETTING

Connect a voltmeter to the emitter of Q604 and ground on R5 Board and adjust R610 for +9 V ±0.1 V.

### 5-3. +15 V SETTING

Connect a voltmeter to the emitter of Q606 and ground on R5 Board and adjust R616 for +15 V ±0.5 V.

# SECTION 6
# VIDEO SYSTEM ALIGNMENT

## EQUIPMENT REQUIREMENTS

The following test equipment is suggested for use in SONY Authorized Service Stations.

a. TV monitor —SONY CVM series monitor or equivalent
b. Oscilloscopeq —Norde-Mende SO367/1, or equivalent
c. Audio Generator —Norde-Mende SRG389, or equivalent
d. AC VTVM (Audio) —Norde-Mende URV 356/1, or equivalent
e. Volt-Ohm-Milliammeter —Norde-Mende TVM 396/1, or equivalent
f. Prerecorded Test —SONY AV series alignment tape Part No. 8-943-505-80
g. Digital Frequency Counter

The following test equipment is required for use at Factory Service Stations.

a. TV monitor —SONY CVM series monitor or equivalent
b. Oscilloscope —Tektronix 422,561A with 3A1, 3B3 plug-ins, or equivalent
c. Audio Generator —Norde-Mende SRG 389
d. AC VTVM (Audio) —Norde-Mende URV 356/1, or equivalent
e. Volt-Ohm-Milliammeter —Norde-Mende EG 387, or equivalent
f. Prerecorded Test Tape —SONY AV series alignment tape, Part No. 8-943-505-80
g. Digital Frequency Counter

## 6-1. MAXIMUM DEVIATION ADJUSTMENT

(Sync Tip Carrier Frequency, Deviation, White Clip, Dark Clip, and Video Output Level)

*Procedure:*

1. Set up the E-to-E mode with no input singal.
2. Connect the scope to TP-204/V3 Board.
3. Adjust R228/V3 Board (Sync Tip Carrier Freq.) for 3.8 MHz as indicated on the scope screen. 3.8 MHz can be measured as follows:

   Check the scope time-base calibration before making this adjustment.

   a. Adjust scope time base for 0.5 μsec per division (Calibrated).
   b. Set scope controls to obtain a stable trace. A correct carrier frequency of 3.8 MHz is indicated when there are 19 complete square waves in ten divisions. Set R228 to produce this indication.
4. Connect a scope to TP-307/V1 Board. Terminate the VIDEO OUT connector with a 75 Ω terminator.
5. Play back the SONY Alignment Tape.
6. Adjust R319 (Video Output Level) for 1.0 volt (p-p) ±0.05 V.
7. Connect a television camera or tune in a telecast signal and set up the E-to-E mode. Select the AGC mode.
8. Adjust R221/V3 Board for 1 V(p-p) ±0.05 V at TP-307/V1 Board.
9. Select the MANUAL record mode. Adjust the VIDEO LEVEL control on the control panel for 1 V(p-p) ±0.05 V at TP-307/V1 Board.
10. Adjust R394 so that the video level meter stays in the center of the blue region.
11. Select the AGC, E-to-E mode.
12. Connect the scope to TP-203/V3 Board.
13. Adjust R238 so that the negative spike in the vertical blanking pulse falls 30% ±10% below sync tip amplitude. See Fig. 6-1.
14. Adjust R237 (White Clip) so htat extreme peak-white parts of the waveform are A + A/2 volts (p-p) as shown in Fig. 6-1.

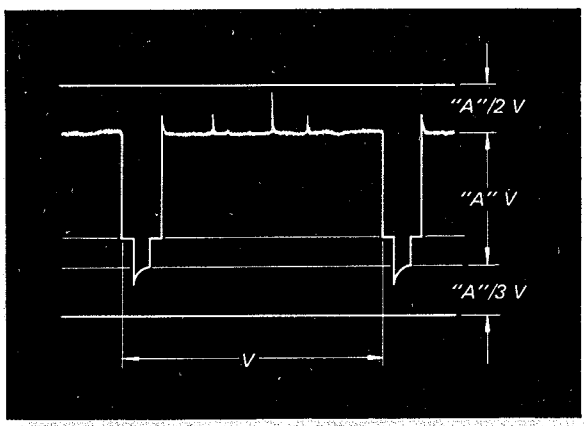



*Fig. 6-1. White clip and dark clip levels*

## 6-2. CARRIER LEAK ADJUSTMENT

The fm signal waveform must be symmetrical throughout the rf system, from the modulator to the demodulator or carrier energy will appear in the picture as a herringbone pattern.

*Procedure:*

1. Check carrier frequency and maximum deviation See Section 6-1.

   **Note:** Because the procedure in Sec. 6-1 is lengthy and somewhat complicated, it may be checked and, if necessary, readjusted after Sec. 6-2. If the procedure in this section does not yield correct results, however, carrier frequency and maximum deviation must be set (See 6-1).

2. Play back the SONY Alignment Tape and observe the picture. If carrier leak is visible, trim up R305/V1 Board and R315 to minimize carrier leak in the playback picture.
3. Set up the E-to-E mode using a camera or telecast signal.
4. Adjust R248 and C251 for minimum carrier leak. Repeat both adjustments.*
5. Repeat Steps 2 to 4.
   *These components adjust the operating point and the RC time constant of the multivibrator (modulator) so that it produces a symmetrical output waveform.

## 6-3. NOISE ELIMINATOR ADJUSTMENT

*Procedure:*

1. Set up the E-to-E mode using a camera or telecast signal.
2. Connect the scope to TP-307/V1 Board.
3. Observe the horizontal sync shown in Fig. 6-2.

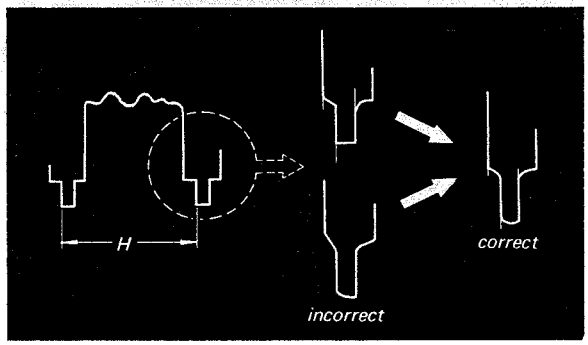
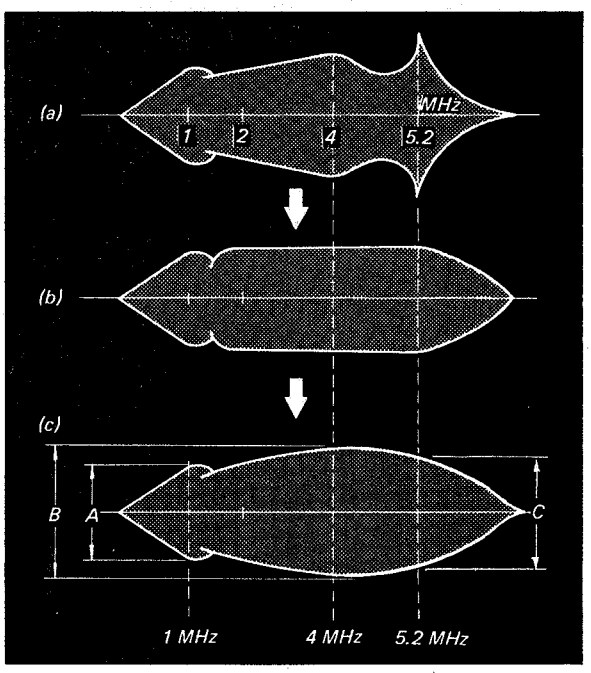



*Fig. 6-2. Noise eliminator adjustment*

Adjust R345/V1 so that the amplitude of undershoot at front porch of horizontal sync is same as amplitude of horizontal sync.

## 6-4. PLAYBACK PREAMPLIFIER ADJUSTMENT

1. Play back the rf sweep portion of the SONY alignment tape.
2. Connect the scope to TP-207/V3 Board. Sync the scope externally from TP-102/SV2 Board. Set the scope time base to 2 msec/cm. Four markers in the playback rf signal indicate the 1 MHz, 2 MHz, 3.58 MHz and 4.5 MHz points.
3. Set R283 (resonance gain) fully clockwise. Set R285 (resonance gain) fully counterclockwise. Adjust C237 (CH-A) and C290 (CH-B) for a resonant frequency of 5.2 MHz. See Fig. 6-3 (a).
4. Adjust R283 and R285 for the correct playback rf envelope as shown in Fig. 6-3 (b).
5. Set R293 (equalizer gain) fully clockwise Adjust L205 for equalize frequency of 4 MHz. See Fig. 6-3 (a) adjust R283, R285 and R293 for flat rf envelope as shown in Fig. 6-3 (b).




*B/A = 140% ±10%*
*C/A = 120% ±10%*

*A : 1 MHz*
*B : 4 MHz*
*C : 5.2 MHz*

*Fig. 6-3. Playback RF sweep waveform*

6. Readjust R293 so that the amplitude of 4 MHz portion is 140% of 1 MHz portion amplitude. Readjust R283 (CH-A), R285 (CH-B) so that the amplitude of 5.2 MHz potion is 120% of 1 MHz portion amplitude.

## 6-5. RECORD CURRENT ADJUSTMENT

The following adjustment sets the level of signal applied to the video heads for recording.

*Procedure*

1. Set up the record mode using the signal that has the stable white peak such as a stair step signal. Set the machine to the AGC mode.
2. Connect the scope to TP-208/V3 Board and externally trigger it from TP-202/V3 Board. Adjust R243 /V3 Board so that the amplitude corresponding to the sync signal portion is 0.8 V(p-p).

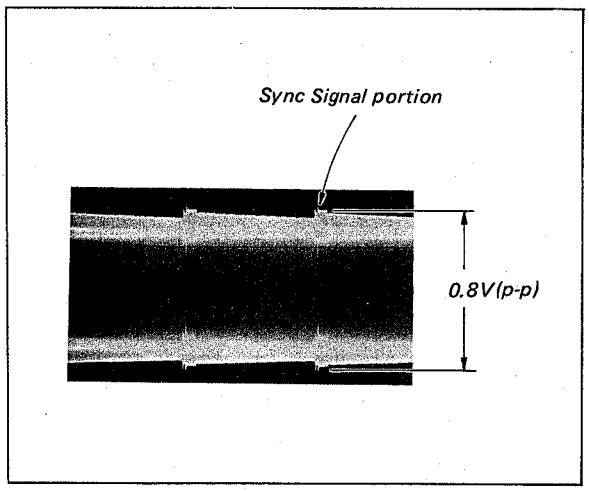



*Fig. 6-4. Record amp input level adjustment*

3. Temporarily connect two resistors of 5.1 ohms to the relaying board on the head drum as shown in the Fig. 6-5.
   Connect the scope across the resistor and externally trigger it from TP-202/V3 Board.
   Adjust R260 and R264; CH-A (R269 and R273; CH-B) on the V3 Board so that the both amplitude corresponding to the horizontal sync signal portion and the white peak portion satisfy the specifications shown in the Fig. 6-5.
4. After the adjustment, remove the resistors and reconnect the leads.

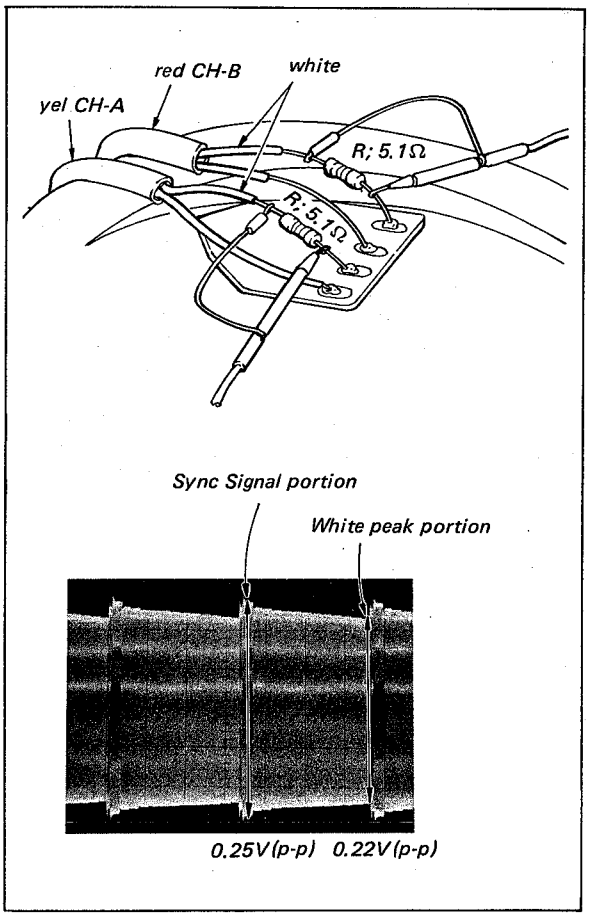



*Fig. 6-5. Record current adjustment*

## 6-6. TRACKING METER SET

*Procedure:*

1. Record the camera or telecast signal.
2. Connect the scope to the TP-207/V3 Board.
3. Play back the tape and adjust the TRACKING control on the control panel for maximum amplitude on the scope.
4. Adjust R390/V1 Board so that the tracking meter indicates the fifth division from the left. See Fig. 6-6.

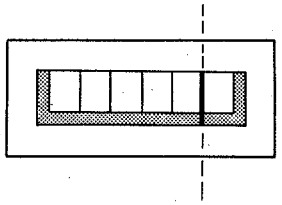


*Fig. 6-6. Tracking meter set*

## 6-7. EDITING MODE CHECK

*Procedure:*

1. Set up the record mode using the camera or telecast signal.
2. Connect the scope to TP-205 or TP-206/V3 Board.
3. Press the EDIT button while watching the scope. Confirm that the signal level on the scope increases by 40% to 75% over that of the normal record mode.
4. Play back the tape with the scope connected to TP-205 or TP-206.
5. Press first the EDIT and then the RECORD button while watching the signal level on the scope.
6. Confirm that the signal amplitude decreases to normal amplitude two to four seconds after the RECORD button is pressed.

# SECTION 7
# SERVO SYSTEM ALIGNMENT

## 7-1. DRUM SERVO ADJUSTMENT (SV2 Board)

### 7-1-1. Drum Free-Running Speed Check

1. Unsolder the lead from the emitter of Q109 on the SV2 Board to the brake coil.
2. Connect a frequency counter to TP-409 on the SV4 Board and check that the frequency of the 25PG pulse is from 25.20 to 25.29 Hz (time : 39.68 ~ 39.54 msec).
3. If it is not, check the drum belt or power voltage or replace the drum pulley.
4. Reconnect the lead after adjustment.

### 7-1-2. Sync Separator Check

1. Set up the E-to-E mode using a telecast signal.
2. Connect the scope to TP-105 on the SV2 Board and confirm that the output is more than 10V ±1V.

### 7-1-3. f/2 Countdown Multivibrator Setting

1. Connect the scope to TP-103, on the SV2 Board.
2. Adjust R125 so that pulse width is 11 ±1 msec. See Fig. 7-1.

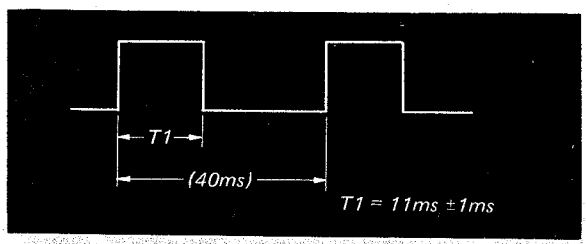



*Fig. 7-1. Countdown multivibrator setting*

### 7-1-4. 25 Hz Pulse Adjustment

1. Connect the scope to TP-104, on the SV2 Board.
2. Adjust R129 so that intervals T1 and T2 are 20 msec ±0.2 msec as shown in Fig. 7-2.

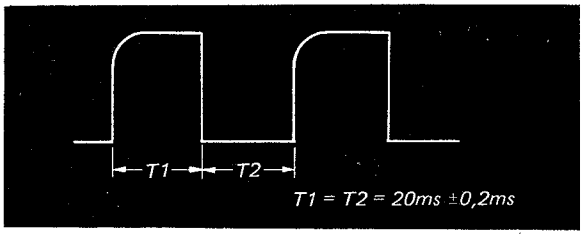



*Fig. 7-2.*

### 7-1-5. Gate Pulse Lock Phase Adjustment

1. Connect the scope to TP-105, on the SV2 Board.
2. Adjust R141 so that the interval of the gate pulse is 900 μs ± 100 μs. See Fig. 7-3.

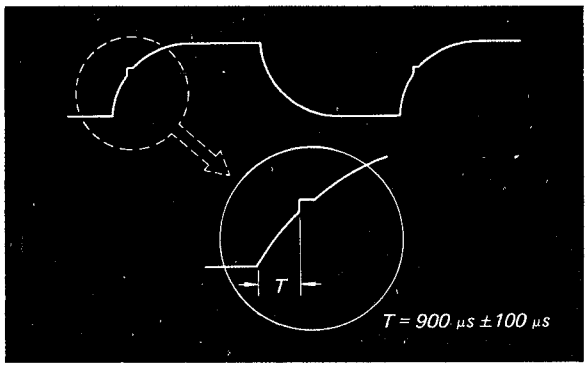



*Fig. 7-3. TP-105 waveform*

### 7-1-6. Lock Phase Adjustment

1. Set up the E-to-E mode.
2. Connect a dual-trace scope to TP-307 on the V1 Board and to TP-409 on the SV4 Board.
3. Adjust R411 on the SV4 Board so that the interval between the leading edge of vertical sync and leading edge of the 25 PG pulse is 8 H ± 1 H as shown in Fig. 7-4.

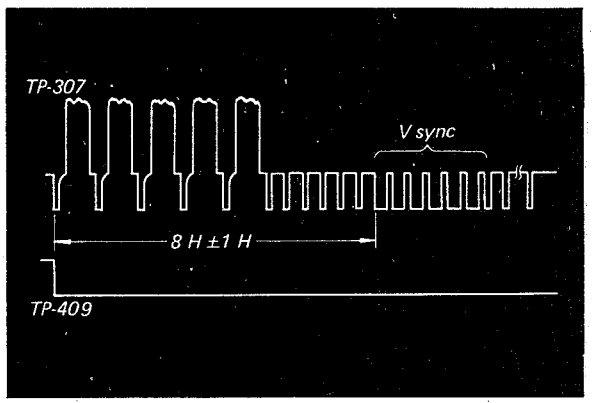



*Fig. 7-4.*

### 7-1-7. Hunting Adjustment

1. Connect the scope to TP-105, on the SV2 Board.
2. Adjust R139 for minimum lock-in time without hunting.

## 7-2. CAPSTAN SERVO ADJUSTMENT (SV4 and SV5 Board)

### 7-2-1. Capstan Free-Running Speed Adjustment

*Record Mode:*

1. Short TP-410 to TP-411 on the SV4 Board with a jumper.
2. Set the VTR to the Record mode without a tape threaded.
3. Connect a frequency counter to TP-701 on the SV5 Board and adjust R707 on the SV5 Board so that frequency generator (FG) signal is 1,010 Hz −1, +0 Hz.
4. Remove the jumper after the adjustment.

*Playback Mode:*

1. Set the VTR to the Playback mode without a tape threaded. In this adjustment, TP-410 and TP-411 are not shorted.
2. Connect the frequency counter to TP-701 on the SV5 Baord and adjust R456 on the SV4 Board to obtain 1,020 Hz ± 2 Hz (stable state after 30 seconds or more).

### 7-2-2. 25 Hz Pulse Adjustment

1. Connect the scope to TP-404, on the SV4 Board.
2. Adjust R437 so that T1 and T2 are 20 msec ±0.2 msec (50% duty cycle) as shown in Fig. 7-5.

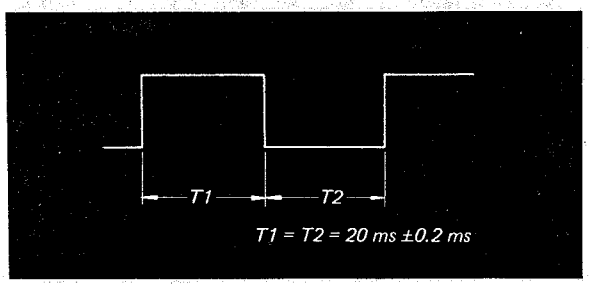



*Fig. 7-5.*

### 7-2-3. Gate Pulse Lock Phase Check

1. Play back a prerecorded tape and connect the scope to TP-405, on the SV4 Board.
2. Confirm that the gate pulse interval is 900 μsec ±300 μsec. See Fig. 7-6.

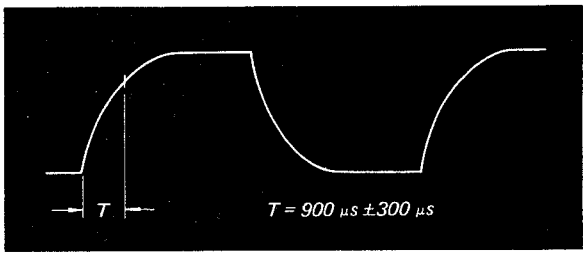



*Fig. 7-6.*

### 7-2-4. Hunting Adjustment

*Record Mode:*

1. Set the VTR to the Record mode and connect the scope to TP-405, on the SV4 Board.
2. Check that gate pulse locks at TP-405 in the range of less than 100 μsec. See Fig. 7-7.

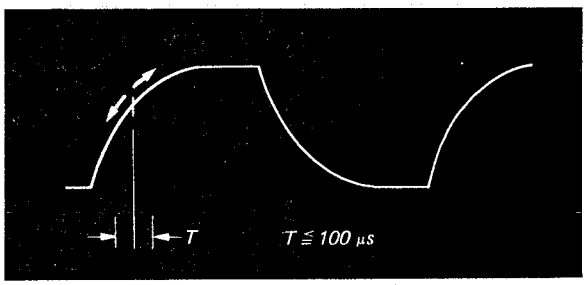



*Fig. 7-7.*

*Playback Mode:*

1. Play back a tape on the VTR. Connect the scope to TP-405, on the SV4 Board.
2. Adjust R452 for minimum hunting (less than 200 μs). See Fig. 7-8.

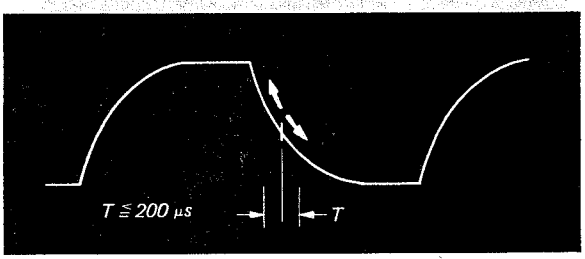



*Fig. 7-8.*

### 7-2-5. CTL Amplifier Check

1. Connect the scope to collector of Q403 on the SV4 Board.
2. Confirm that CTL output is more than 15 V (p-p)

### 7-2-6. Lock Delay Time Check

1. Connect the scope to TP-405, on the SV4 Board.
2. Observe the waveform at TP-405 and confirm that the lock-in time from the appearance of the gate pulse is 2 to 4 sec when the VTR is switched from the Stop mode to the Record Mode.

### 7-2-7. Tracking Control Setting

1. Set the TRACKING control to the mid position. Play back a prerecorded tape.
2. Connect the dual-trace scope to TP-402 and TP-403 on the SV4 Board. Adjust R428 so that the leading edge of the waveform at TP-402 corresponds to the trailing edge of the waveform at TP-403, as shown in Fig. 7-9.

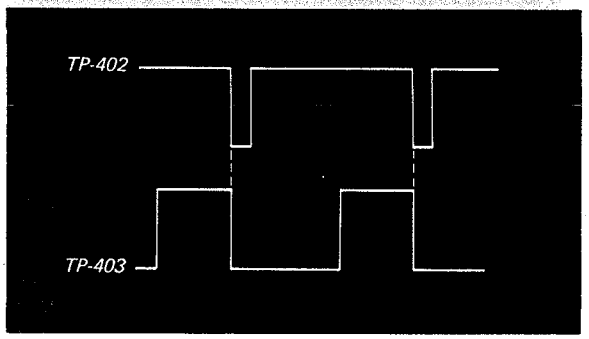



*Fig. 7-9.*

3. Turn the TRACKING control clockwise and counterclockwise and confirm that the output pulse shifts at least 6 msec in both directions. See Fig. 7-10.

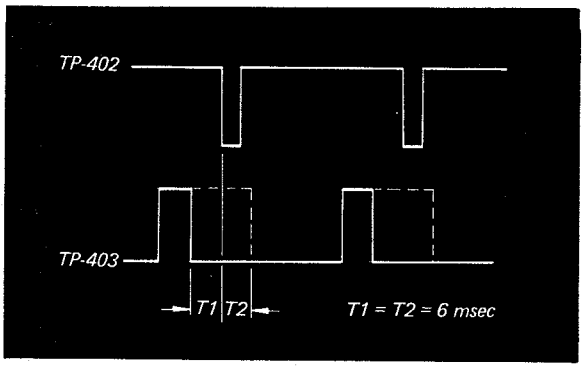


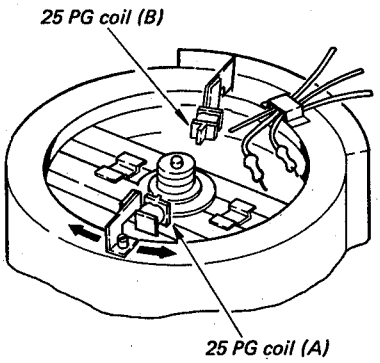

*Fig. 7-10.*

### 7-2-8. Slow-Speed Adjustment

1. Play back a prerecorded tape and set the VTR to the Slow mode. Set the SLOW control for fully counterclockwise.
2. Connect the frequency counter to TP-701 on the SV5 Board and adjust R717 so that FG frequency is 55 to 60 Hz.
3. Set the SLOW control for fully clockwise. Check that FG frequency is more than 200 Hz.

### 7-2-9. 25 PG Coil (A) Position Setting

1. Play back the SONY Alignment Tape.
2. Connect a dual-trace scope to TP-307/V1 Board and to TP-409/SV4 Board. Adjust the 25 PG coil (A) by moving it slightly to the left or right so that the phase between the leading edge of vertical sync of video output and the leading edge of the 25 PG pulse is 8 H ± 1 H. See Fig. 7-11. The 25 PG coil (A) is located at 12 o'clock position on the drum.
3. After this adjustment, adjust Section 7-2-10, 25 PG PULSE PHASE CHECK.



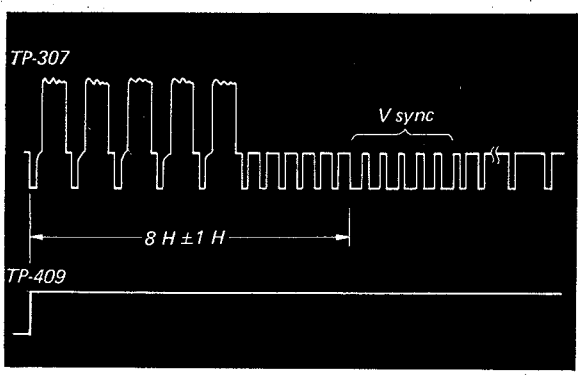




*Fig. 7-11.*

### 7-2-10. 25 PG Pulse Phase Check

This adjustment follows the 25 PG Coil (A) Position setting in Section 7-2-9.

1. Connect the scope to TP-409, on the SV4 Board.
2. Adjust R495 so that T1 and T2 are 20 ms ±0.2msec (50% duty cycle) as shown in Fig. 7-12.

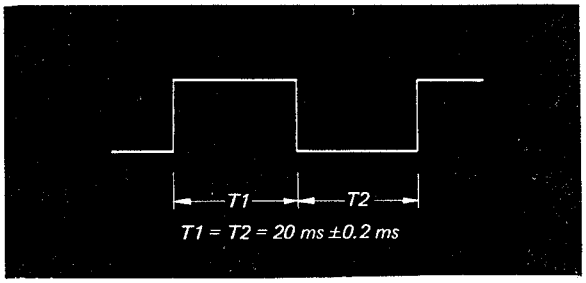



*Fig. 7-12. 25 PG Pulse phase check*

### 7-2-11. Slow 50 PG Position Setting

1. Connect a dual-trace scope to TP-409 on the SV4 Board and TP-307 on the V1 Board. Trigger the scope from TP-409 on the SV4 Board.
2. Play back a alignment tape and set the VTR to the Slow mode.
3. Adjust R377 so that the phase between the leading edge of 50 PG and leading edge of the 25 PG pulse is 250 μsec ±10 μsec. See Fig. 7-13.

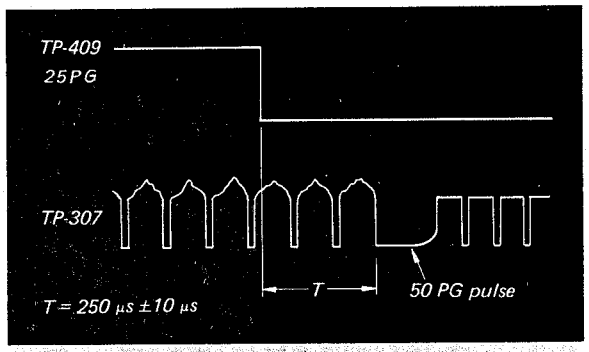



*Fig. 7-13. Position of 50 PG pulse*

# SECTION 8
# AUDIO SYSTEM ALIGNMENT

## 8-1. AUDIO HEAD AZIMUTH ADJUSTMENT

1. Connect a scope or a VTVM to TP-502 on the A2 Board.
2. Play back the 7 kHz part of the SONY Alignment tape.
3. Adjust the Azimuth and Titl Adjusting Screws shown in Fig. 8-1 for maximum output.

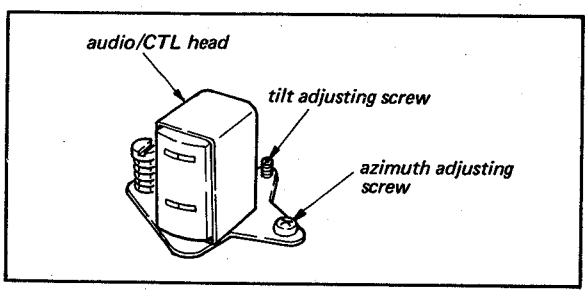



*Fig. 8-1. Azimuth and tilt adjusting screws*

## 8-2. LEVEL METER SETTING

1. Set the VTR to Manual in the E-to-E mode.
2. Feed a 1 kHz signal, −65 dB to the MIC IN jack in CAMERA or LINE mode. Terminate the LINE OUT jack with a 10 kΩ resistor and connect a VTVM. Adjust the LEVEL control on the control panel so that the LINE OUT level is 0 dB.
3. Adjust R539 so that the pointer of the level meter is positioned as shown in Fig. 8-2.

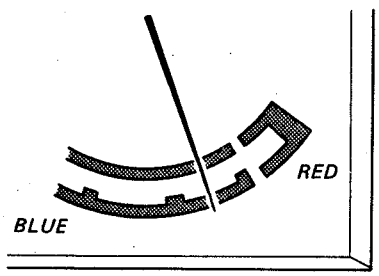



*Fig. 8-2. Level meter setting*

## 8-3. AGC LEVEL SETTING

1. Set the VTR to AGC in the E-to-E mode.
2. Terminate the LINE OUT jack with a 10 kΩ resistor and connect a VTVM.
3. Feed a 1 kHz signal, −65 dB to the MIC IN jack in the CAMERA or LINE mode.
4. Adjust R538 to obtain a meter reading of 0 dB.

## 8-4. AUDIO BIAS SETTING

1. Feed a 1 kHz, −65 dB signal to the MIC IN jack.
2. Thread a tape onto the Videocorder. Connect a camera and a monitor to the recorder and a VTVM to TP-504 on the A2 Board.
3. Point the camera at the VTVM so that the meter indication is visible on the monitor in the Record mode.
4. Make a recording of the input audio signal while varying C536 (on the A2 Board) throughout its range very slowly.
5. Rewind and play back the tape. Watching the monitor, note the level on the meter (the playback picture) at which output is greatest, as indicated by the playback sound level.
6. Set the VTR to the Record mode again and adjust C536 for the reading that gave maximum output during playback.
7. Set the VTR to the Audio Dub mode and adjust L401 on the SV4 Board for the same reading (at TP-504/A2 Board) that gave maximum output during playback.

## 8-5. PLAYBACK LEVEL SETTING

1. Connect the VTVM to the LINE OUT jack using a 10 kΩ load resistor.
2. Play back the 1 kHz part of the SONY Alignment tape and adjust R518 so that the line out level is 0 dB ±0.5 dB.

## 8-6. BIAS TRAP ADJUSTMENT

1. Connect a VTVM to TP-505. Set the VTR in the record mode.
2. Adjust L502 for minimum output.

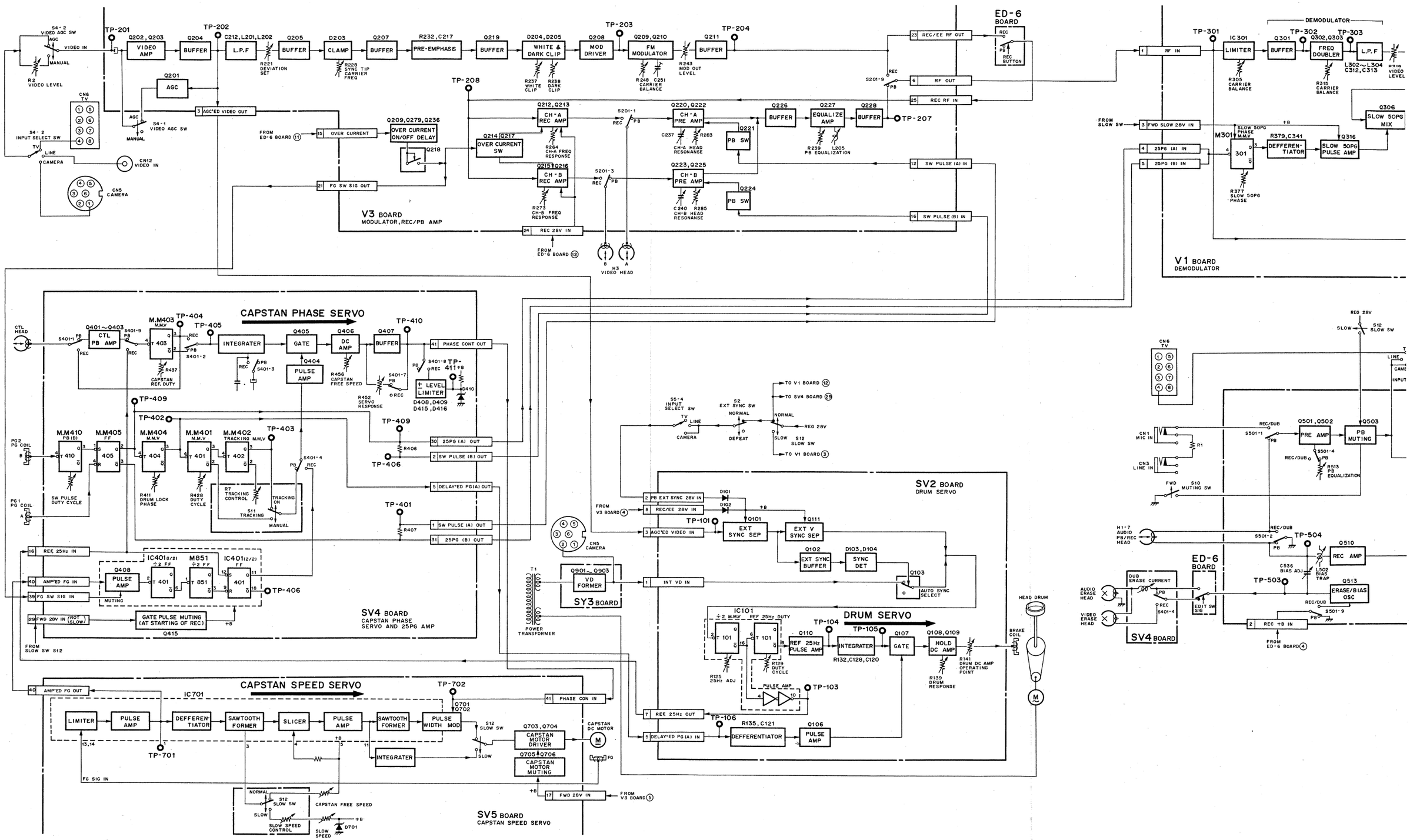
## 8-7. OVERALL FREQUENCY CHARACTERISTICS

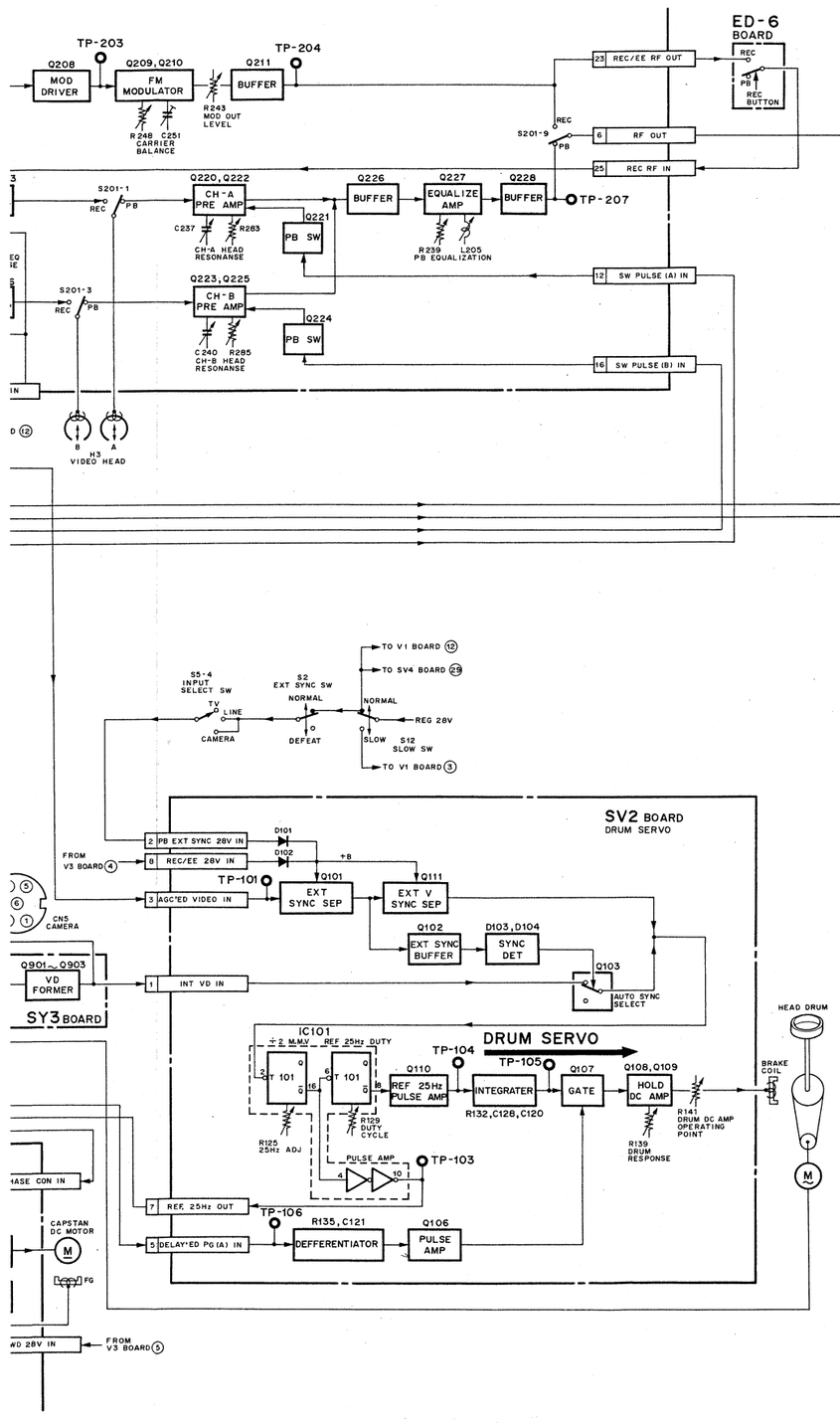
1. Connect a VTVM to the LINE OUT jack using a 10 kΩ load resistor.
2. Feed a 1 kHz signal, −65 dB to the MIC IN jack and make a recording. Play back the tape and confirm that the output is 0 dB ±2 dB.
3. Record 100 Hz and 10 kHz, −65 dB signals and play back the tape. Check that the frequency response conforms to the following specifications. If it does not, adjust R513. Repeat Section 8-5. PLAYBACK LEVEL SETTING.

| | | |
|---|---|---|
| Specifications: | 1 kHz | 0 dB ±2 dB |
| | 100 Hz | 0 dB $^{+0\ dB}_{-6\ dB}$ |
| | 10 kHz | −1 dB ±0.5 dB |

# SECTION 9
# DIAGRAMS

## OVERALL BLOCK DIAGRAM

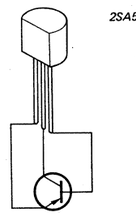



TP-203
Q208
MOD DRIVER
Q209,Q210
FM MODULATOR
R248 C251 CARRIER BALANCE
TP-204
Q211
BUFFER
R243 MOD OUT LEVEL
ED-6 BOARD
REC
PB
REC BUTTON
23 REC/EE RF OUT
S201-9
REC
PB
6 RF OUT
25 REC RF IN
S201-1
REC
PB
Q220,Q222
CH-A PRE AMP
C237 R283 CH-A HEAD RESONANSE
Q221
PB SW
Q226
BUFFER
Q227
EQUALIZE AMP
R239 L205 PB EQUALIZATION
Q228
BUFFER
TP-207
12 SW PULSE (A) IN
S201-3
REC
PB
Q223,Q225
CH-B PRE AMP
C240 R285 CH-B HEAD RESONANSE
Q224
PB SW
16 SW PULSE (B) IN
B
A
H3 VIDEO HEAD
TO V1 BOARD (12)
TO SV4 BOARD (29)
S5-4 INPUT SELECT SW
TV
LINE
CAMERA
S2 EXT SYNC SW
NORMAL
DEFEAT
NORMAL
REG 28V
SLOW
S12 SLOW SW
TO V1 BOARD (3)
SV2 BOARD
DRUM SERVO
2 PB EXT SYNC 28V IN
8 REC/EE 28V IN
FROM V3 BOARD (4)
D101
D102
+B
TP-101
Q101
EXT SYNC SEP
Q111
EXT V SYNC SEP
3 AGC'ED VIDEO IN
Q102
EXT SYNC BUFFER
D103,D104
SYNC DET
Q103
AUTO SYNC SELECT
CN5 CAMERA
Q901~Q903
VD FORMER
1 INT VD IN
SY3 BOARD
IC101
÷2 M.M.V
REF 25Hz DUTY
T 101
T 101
TP-104
DRUM SERVO
TP-105
Q110
REF 25Hz PULSE AMP
INTEGRATER
R132,C128,C120
GATE
Q107
Q108,Q109
HOLD DC AMP
R141 DRUM DC AMP OPERATING POINT
R139 DRUM RESPONSE
R125 25Hz ADJ
R129 DUTY CYCLE
PULSE AMP
TP-103
HEAD DRUM
BRAKE COIL
M
7 REF. 25Hz OUT
TP-106
R135,C121
DEFFERENTIATOR
Q106
PULSE AMP
5 DELAY'ED PG(A) IN
CAPSTAN DC MOTOR
FG
FROM V3 BOARD (5)
V1 BOARD
DEMODULATOR
1 RF IN
TP-301
IC 301
LIMITER
R305 CARRIER BALANCE
DEMODULATOR
TP-302
Q301
BUFFER
TP-303
Q302,Q303
FREQ DOUBLER
R315 CARRIER BALANCE
L.P.F
L302~L304 C312,C313
Q304
VIDEO AMP
R319 VIDEO OUT LEVEL
Q317,Q323
DE-EMPHASIS
Q304,Q305
VIDEO AMP
NOISE ELIMINATOR
TP-304
Q306
SLOW 50PG MIX
Q307
BUFFER
C337,C323
L.P.F
Q308
LOW FREQ VIDEO BUFFER
Q312
HIGH/LOW FREQ MIXER
Q313
BUFFER
Q314,Q315
VIDEO AMP
TP-306
TP-307
TP-308
TP-309
CN13 VIDEO OUT
CN6 TV
CN14 RF MOD
CN4 RF OUT
FROM SLOW SW
3 FWD SLOW 28V IN
SLOW 50PG PHASE M.M.V
M3011
301
R379,C341
DEFFEREN-TIATOR
TP-316
SLOW 50PG PULSE AMP
R377 SLOW 50PG PHASE
4 25PG (A) IN
5 25PG (B) IN
TP-305
Q325
H.P.F
Q309~Q311
HIGH FREQ VIDEO AMP
D303~D305
NOISE SLICE
R345 NOISE ELIMINATOR
Q319
VIDEO METER DRIVER
D310,D311
RECTIFIER
R394 VIDEO METER ADJ
VIDEO LEVEL METER
Q317
PB RF BUFFER
Q318
TRACKING METER DRIVER
D308,D309
RECTIFIER
R390 TRACKING METER ADJ
TRACKING METER
+B
11 EE 28V IN
12 FWD 28V IN (NOT SLOW)
6 PB DUB 28V IN
FROM ED-6 BOARD (29)
FROM EXT SYNC SW S2
FROM V3 BOARD (7)
REG 28V
SLOW
S12 SLOW SW
CN6 TV
TV
LINE
CAMERA
S5-2 INPUT SELECT SW
R9 LEVEL CONTROL
MANUAL
AGC
S4-2 VIDEO AGC SW
TP-501
TP-502
CN1 MIC IN
R1
CN3 LINE IN
FWD
S10 MUTING SW
REC/DUB
S501-1
PB
Q501,Q502
PRE AMP
Q503
PB MUTING
S501-4
R513 PB EQUALIZATION
Q504,Q505
AGC
PB LEVEL
S501-5
Q506,Q507
LINE AMP
Q508
BUFFER
S501-6
D501,D502
AGC DET
R538 AGC ADJ
D503,D504
RECTIFIER
R539 METER ADJ
AUDIO LEVEL METER
H1-7 AUDIO PB/REC HEAD
S501-2
TP-504
Q510
REC AMP
C536 BIAS ADJ
L502 BIAS TRAP
ED-6 BOARD
DUB ERASE CURRENT
AUDIO ERASE HEAD
VIDEO ERASE HEAD
PB
REC
S401-4
EDIT SW S10
TP-503
Q513
ERASE/BIAS OSC
S501-9
2 REC +B IN
FROM ED-6 BOARD (4)
A2 BOARD
AUDIO PB/REC AMP
AGC
MANUAL
S4-1 AUDIO AGC SW

## V3 BOARD (VIDEO MODULATOR & REC/PB AMPLIFIER) PRINTED WIRING BOARD REF. NO. 200 SERIES

*SOLDERING SIDE*

| | | | | | |
|---|---|---|---|---|---|
| C237 | A - 2 | Q208 | F - 2 | R221 | G - 3 |
| C240 | B - 2 | Q209 | E - 1 | R228 | G - 2 |
| C251 | E - 1 | Q210 | F - 2 | R237 | G - 1 |
| | | Q211 | E - 3 | R238 | G - 1 |
| D201 | G - 3 | Q212 | A - 3 | R243 | E - 2 |
| D202 | F - 4 | Q213 | A - 3 | R248 | E - 2 |
| D203 | G - 2 | Q214 | A - 4 | R260 | C - 3 |
| D204 | F - 2 | Q215 | B - 3 | R264 | A - 3 |
| D205 | F - 2 | Q216 | B - 3 | R269 | C - 4 |
| D206 | E - 2 | Q217 | B - 4 | R273 | B - 3 |
| D207 | E - 2 | Q218 | C - 3 | R283 | A - 2 |
| D208 | E - 3 | Q219 | F - 2 | R285 | B - 2 |
| D209 | C - 4 | Q220 | A - 1 | R293 | C - 2 |
| | | Q221 | A - 1 | | |
| L205 | B - 2 | Q222 | C - 2 | TP-201 | D - 3 |
| | | Q223 | B - 1 | TP-202 | G - 3 |
| Q201 | E - 3 | Q224 | B - 1 | TP-203 | F - 3 |
| Q202 | E - 3 | Q225 | B - 2 | TP-204 | D - 2 |
| Q203 | F - 3 | Q226 | C - 1 | TP-205 | A - 3 |
| Q204 | F - 3 | Q227 | D - 1 | TP-206 | B - 3 |
| Q205 | G - 3 | Q228 | D - 2 | TP-207 | D - 2 |
| Q207 | G - 2 | | | TP-208 | C - 4 |



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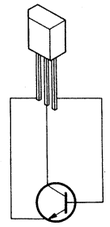

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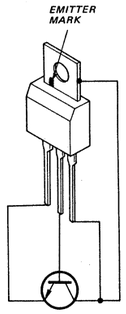
2SC634A

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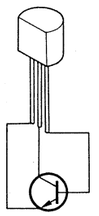

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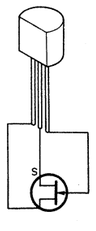


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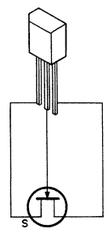


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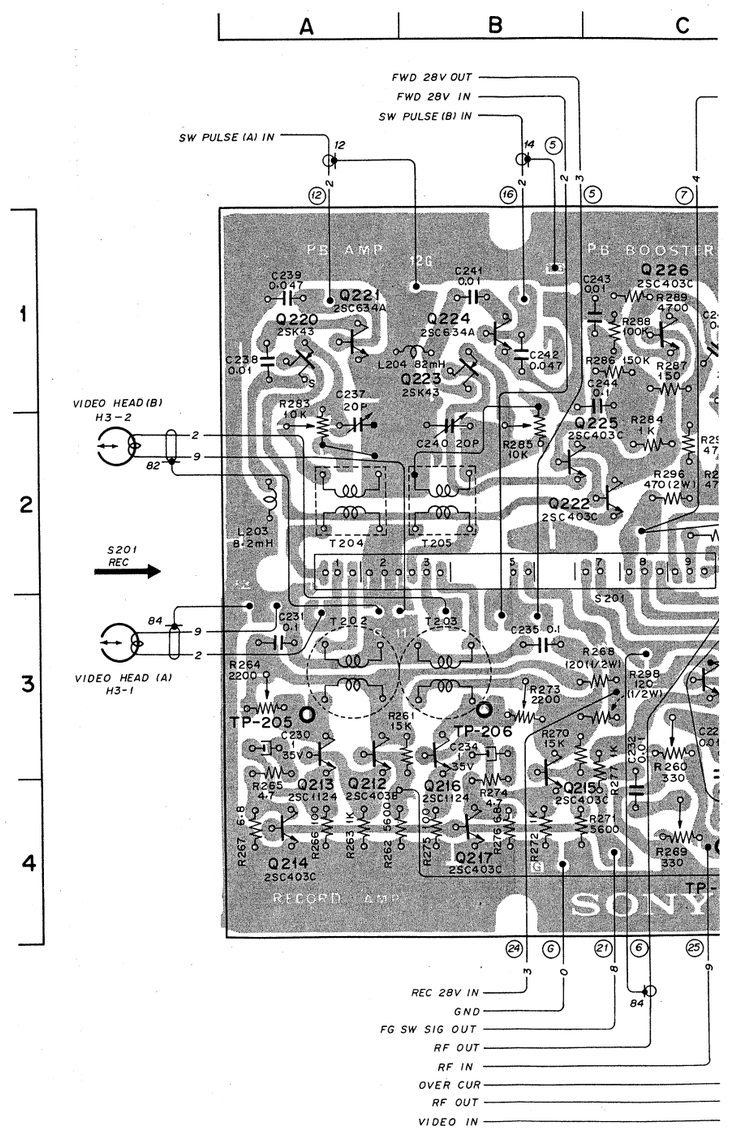
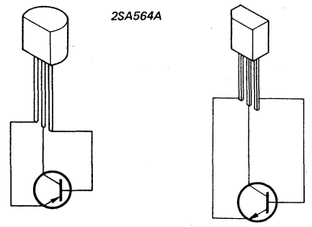
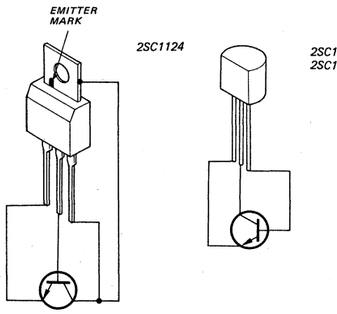


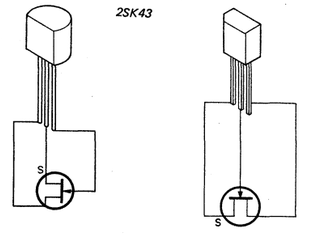
## V3 BOARD (VIDEO MODULATOR & REC/PB AMPLIFIER) PRINTED WIRING BOARD REF. NO. 200 SERIES

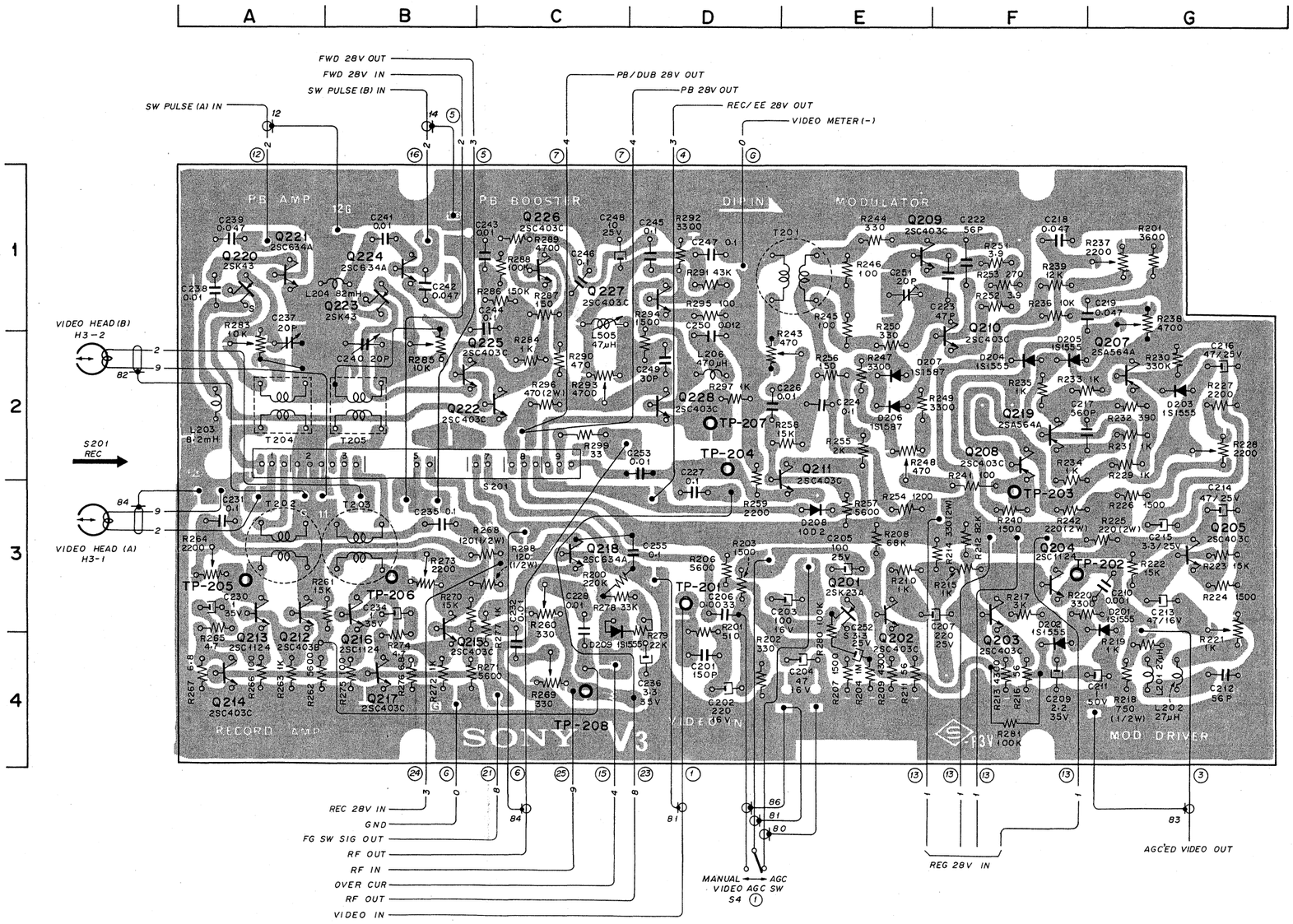
*SOLDERING SIDE*

| | | | | | |
|---|---|---|---|---|---|
| C237 | A - 2 | Q208 | F - 2 | R221 | G - 3 |
| C240 | B - 2 | Q209 | E - 1 | R228 | G - 2 |
| C251 | E - 1 | Q210 | F - 2 | R237 | G - 1 |
| | | Q211 | E - 3 | R238 | G - 1 |
| D201 | G - 3 | Q212 | A - 3 | R243 | E - 2 |
| D202 | F - 4 | Q213 | A - 3 | R248 | E - 2 |
| D203 | G - 2 | Q214 | A - 4 | R260 | C - 3 |
| D204 | F - 2 | Q215 | B - 3 | R264 | A - 3 |
| D205 | F - 2 | Q216 | B - 3 | R269 | C - 4 |
| D206 | E - 2 | Q217 | B - 4 | R273 | B - 3 |
| D207 | E - 2 | Q218 | C - 3 | R283 | A - 2 |
| D208 | E - 3 | Q219 | F - 2 | R285 | B - 2 |
| D209 | C - 4 | Q220 | A - 1 | R293 | C - 2 |
| | | Q221 | A - 1 | | |
| L205 | B - 2 | Q222 | C - 2 | TP-201 | D - 3 |
| | | Q223 | B - 1 | TP-202 | G - 3 |
| Q201 | E - 3 | Q224 | B - 1 | TP-203 | F - 3 |
| Q202 | E - 3 | Q225 | B - 2 | TP-204 | D - 2 |
| Q203 | F - 3 | Q226 | C - 1 | TP-205 | A - 3 |
| Q204 | F - 3 | Q227 | D - 1 | TP-206 | B - 3 |
| Q205 | G - 3 | Q228 | D - 2 | TP-207 | D - 2 |
| Q207 | G - 2 | | | TP-208 | C - 4 |

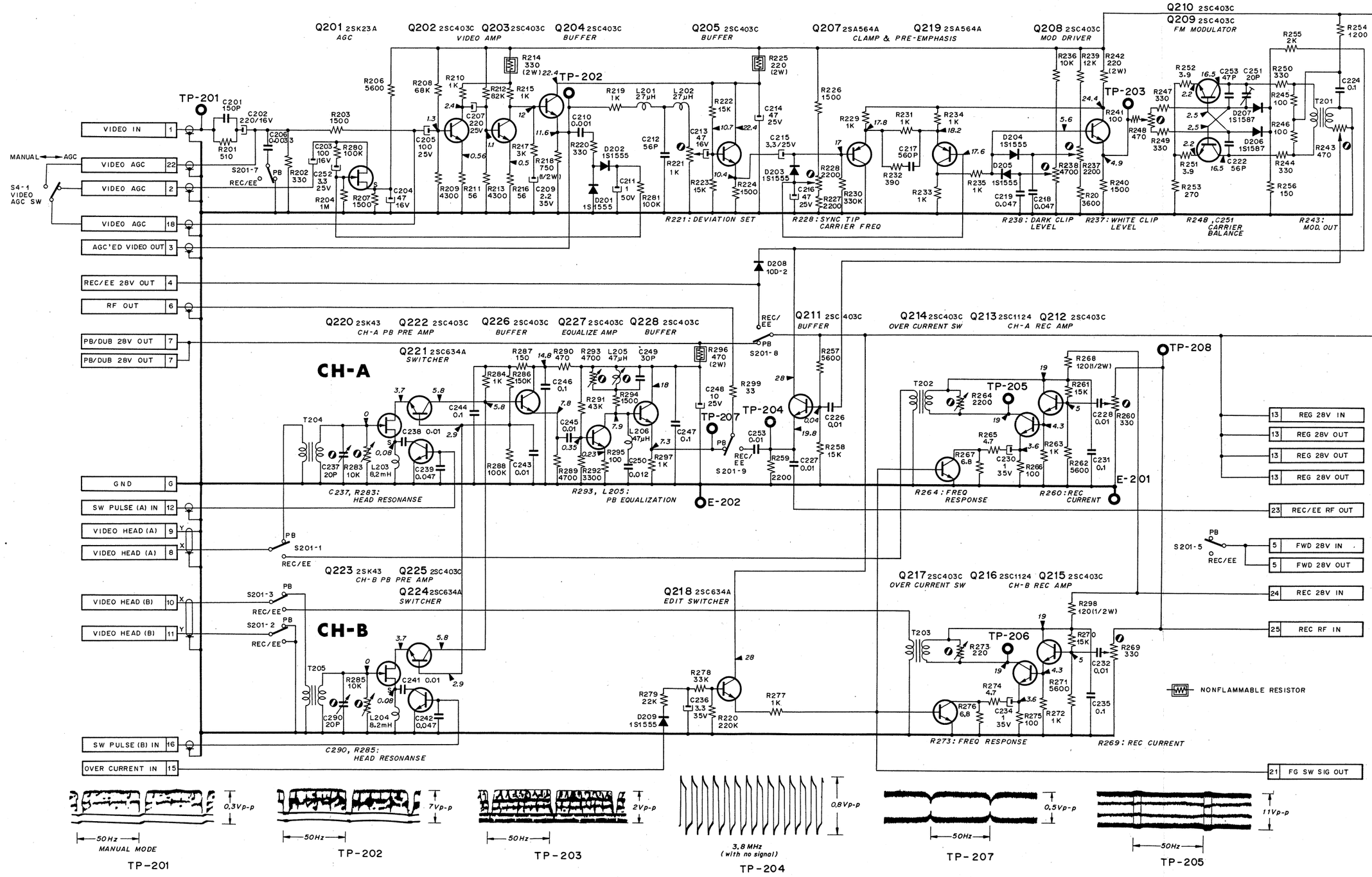


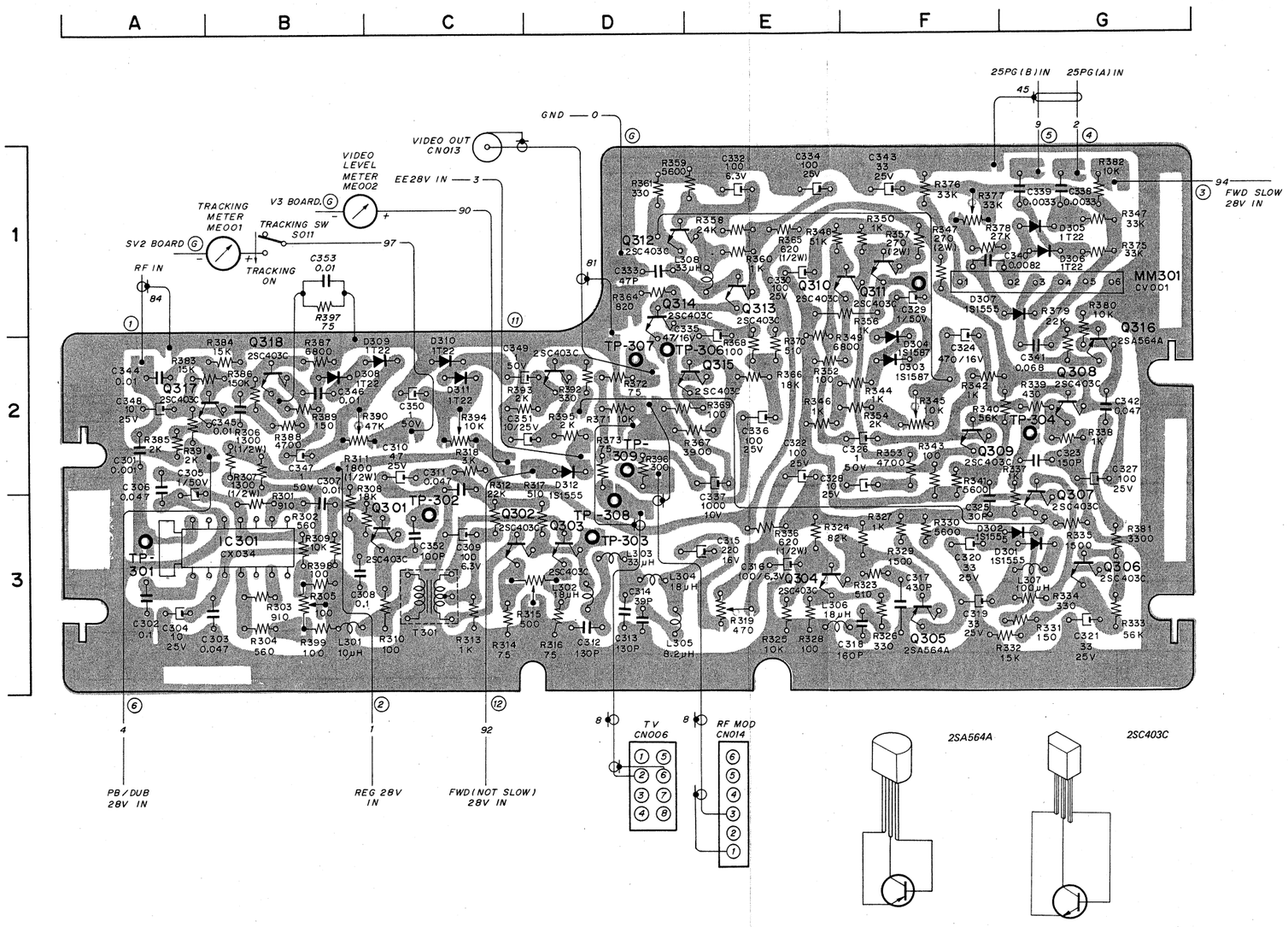



## V3 BOARD (VIDEO MODULATOR & REC/PB AMPLIFIER) SCHEMATIC DIAGRAM REF. NO. 200 SERIES



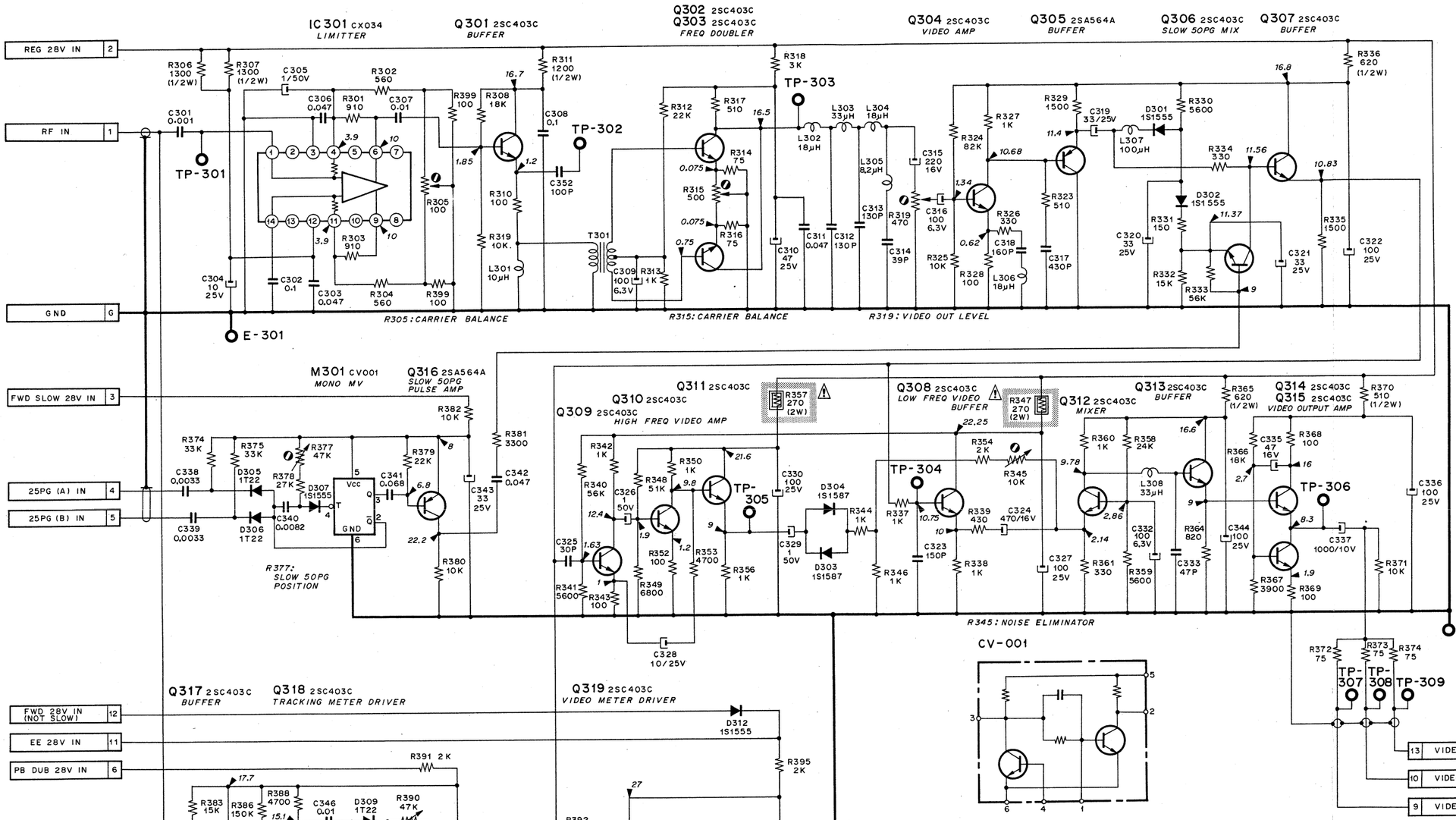
## V1 BOARD (VIDEO DEMODULATOR) PRINTED WIRING BOARD REF. NO. 300 SERIES

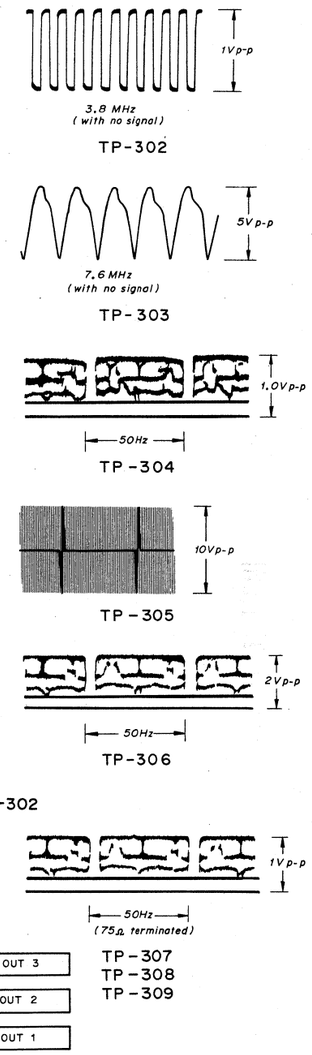
*SOLDERING SIDE*




| | | |
|---|---|---|
| D301 | G | 3 |
| D302 | G | 3 |
| D303 | F | 2 |
| D304 | F | 1 |
| D305 | G | 1 |
| D306 | G | 1 |
| D307 | G | 1 |
| D308 | B | 2 |
| D309 | C | 2 |
| D310 | C | 2 |
| D311 | C | 2 |
| D312 | D | 2 |
| IC301 | B | 3 |
| Q301 | C | 3 |
| Q302 | C | 3 |
| Q303 | D | 3 |
| Q304 | E | 3 |
| Q305 | F | 3 |
| Q306 | G | 3 |
| Q307 | G | 2 |
| Q308 | G | 2 |
| Q309 | F | 2 |
| Q310 | F | 1 |
| Q311 | F | 1 |
| Q312 | E | 1 |
| Q313 | E | 1 |
| Q314 | D | 1 |
| Q315 | E | 2 |
| Q317 | A | 2 |
| Q318 | B | 2 |
| Q319 | D | 2 |
| R305 | B | 3 |
| R315 | D | 3 |
| E319 | E | 3 |
| R345 | F | 2 |
| R377 | F | 1 |
| R390 | B | 2 |
| R394 | C | 2 |
| TP-301 | A | 3 |
| TP-302 | C | 3 |
| TP-303 | D | 3 |
| TP-304 | G | 2 |
| TP-305 | F | 1 |
| TP-306 | D | 2 |
| TP-307 | D | 2 |
| TP-308 | D | 3 |
| TP-309 | D | 2 |

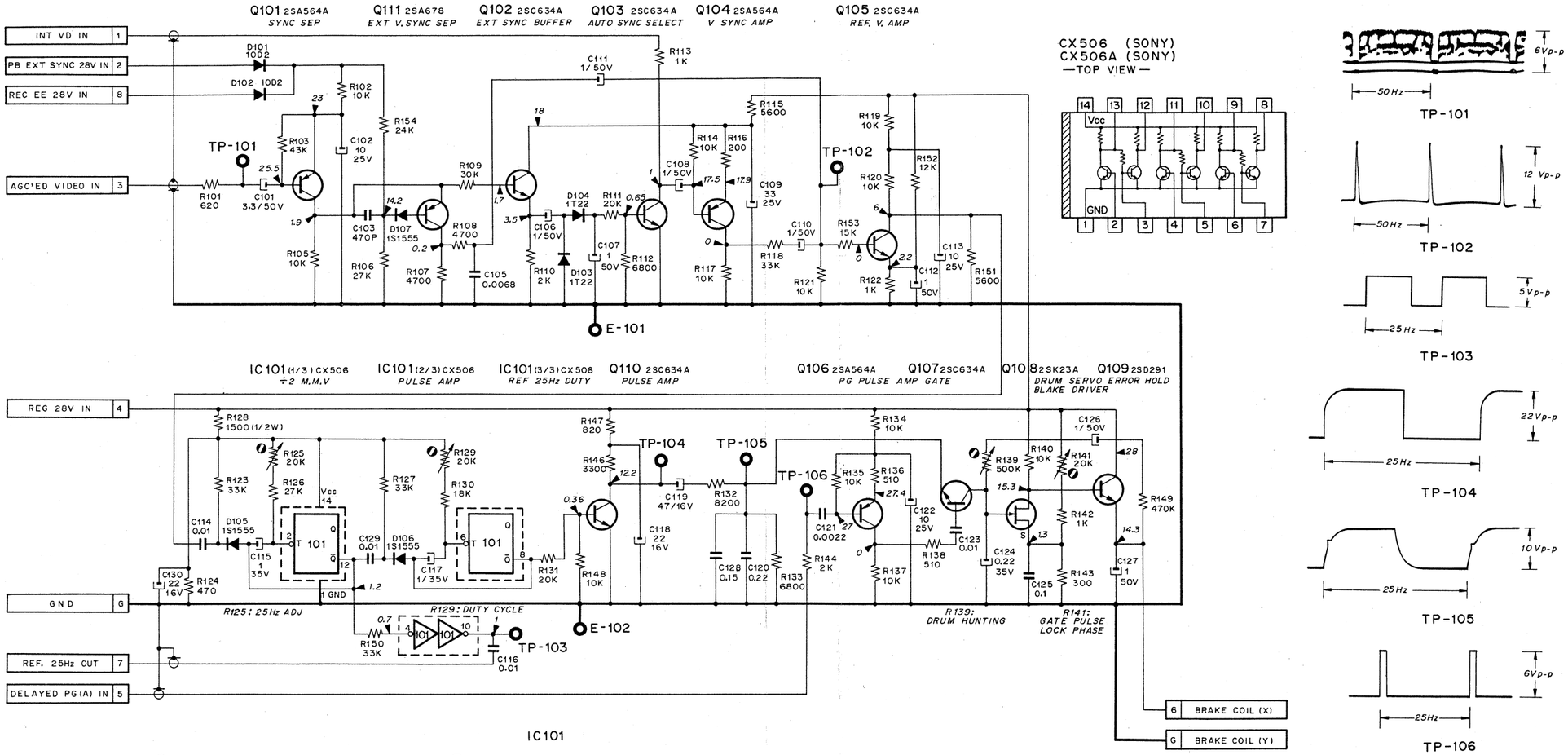
## V1 BOARD (VIDEO DEMODULATOR) SCHEMATIC DIAGRAM REF. NO. 300 SERIES



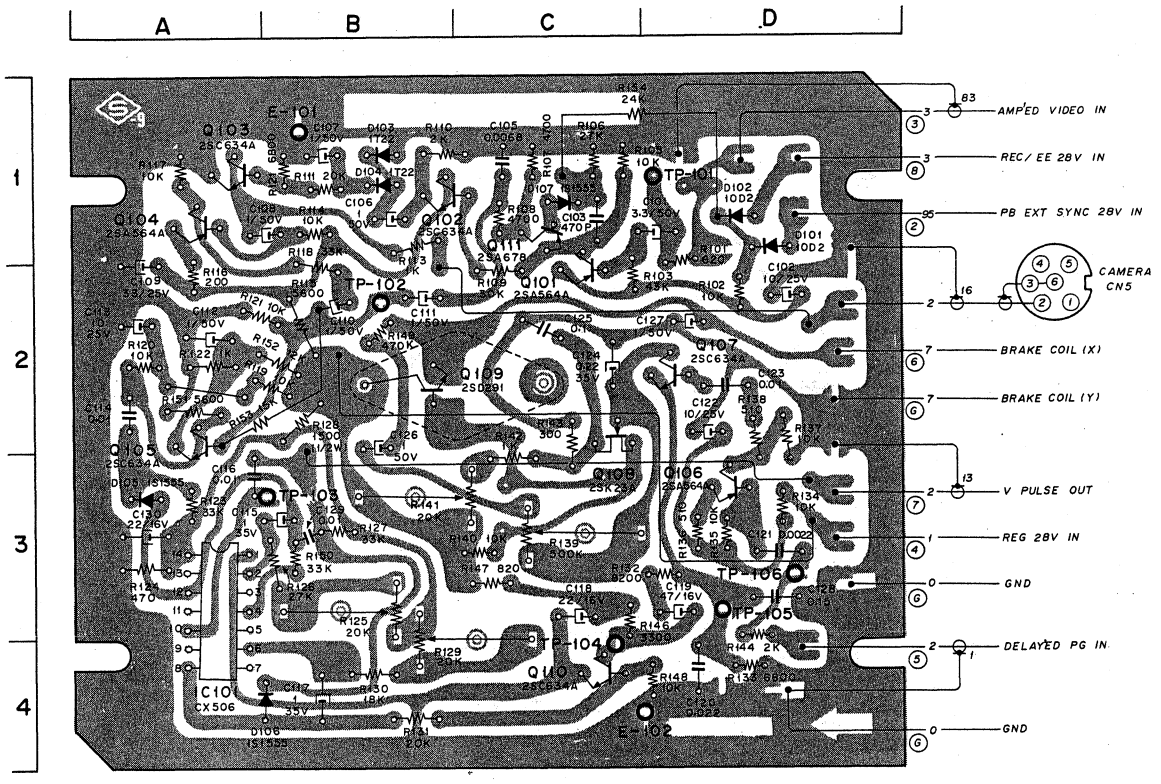

The shaded and ⚠-marked components are critical to safety.
Replace only with same component as specified.

## SV2 BOARD (DRUM SERVO) SCHEMATIC DIAGRAM REF. NO. 100 SERIES



## SV2 BOARD (DRUM SERVO) PRINTED WIRING BOARD REF. NO. 100 SERIES

*SOLDERING SIDE*



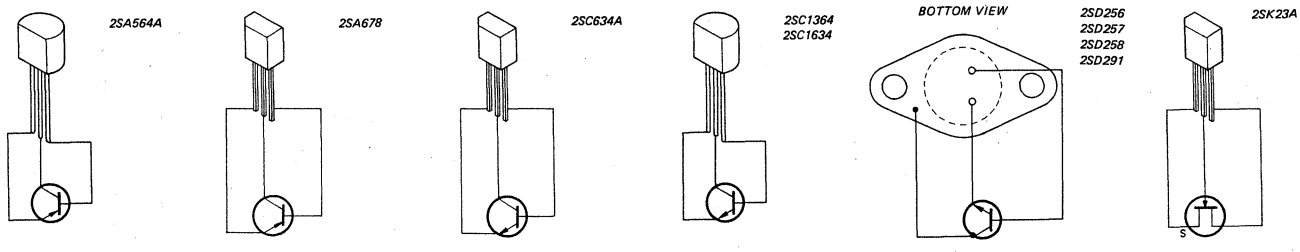

D101 D - 1
D102 D - 1
D103 B - 1
D104 B - 1
D105 A - 3
D106 A - 4
D107 C - 1

IC101 A - 3

Q101 C - 2
Q102 C - 1
Q103 A - 1
Q104 A - 1
Q105 A - 2
Q106 D - 3
Q107 D - 2
Q108 C - 2
Q109 B - 2
Q110 C - 4
Q111 C - 2

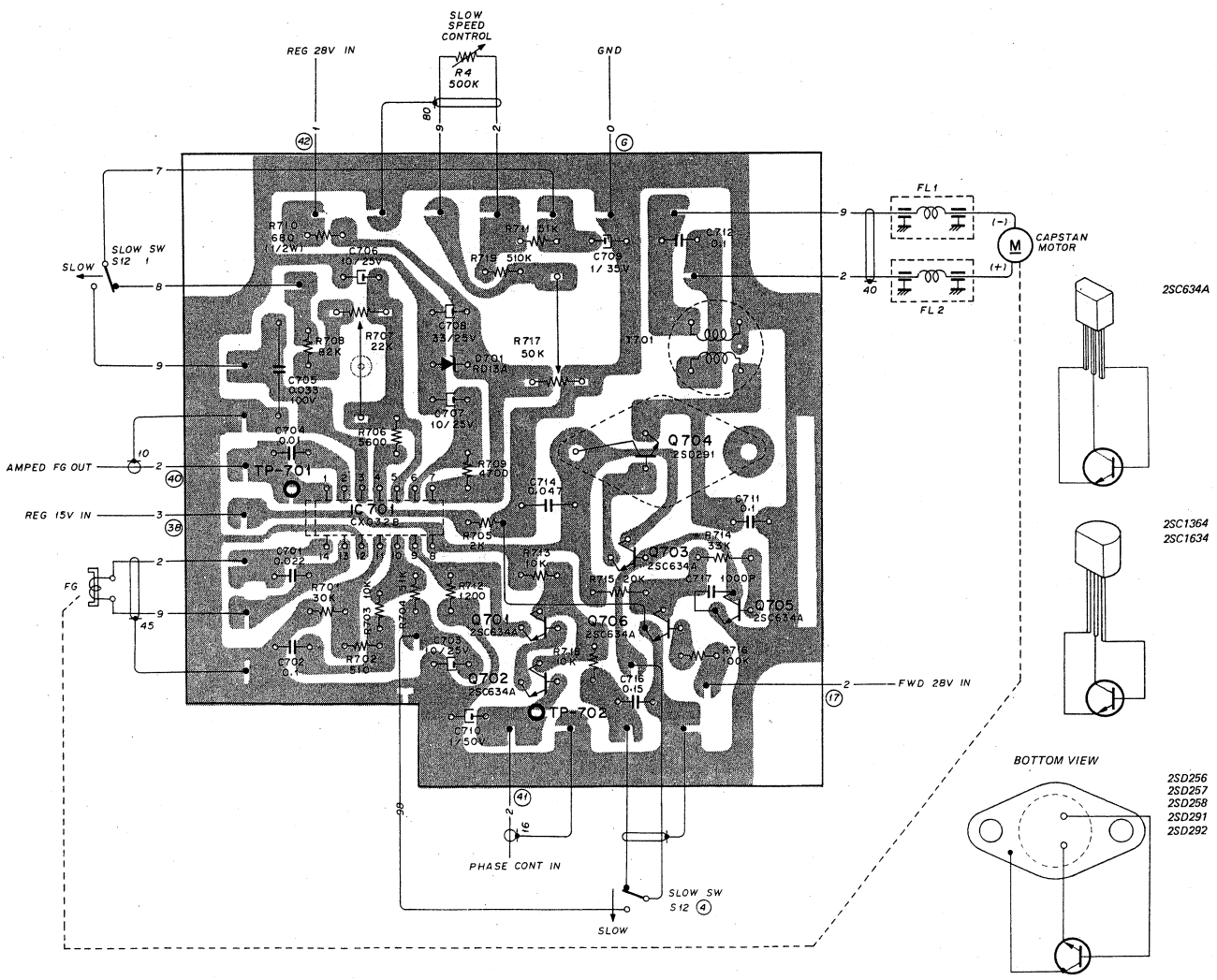
R125 B - 3
R129 C - 4
R139 C - 3
R141 B - 3

TP-101 D - 1
TP-102 B - 2
TP-103 B - 3
TP-104 C - 4
TP-105 D - 3
TP-106 D - 3

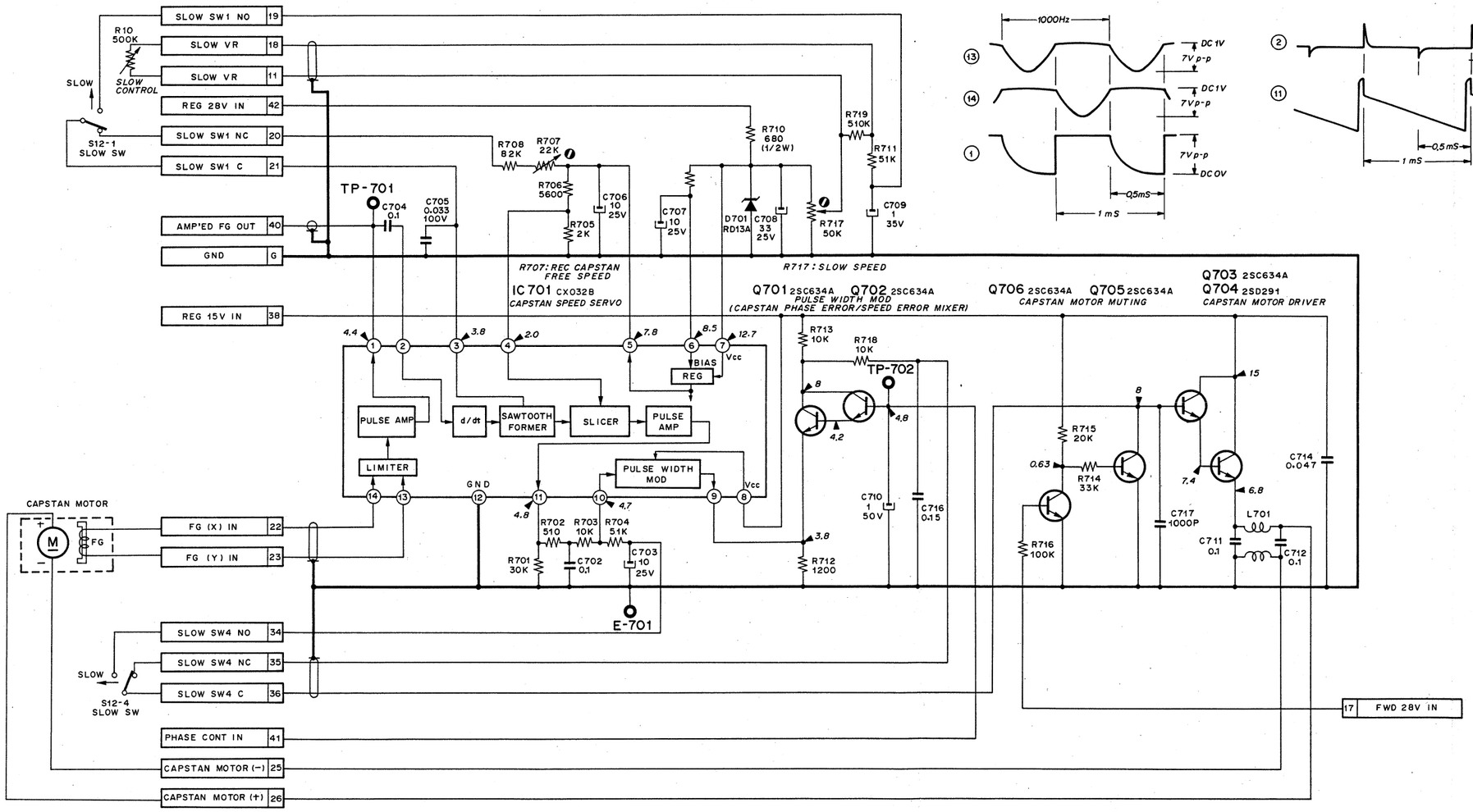


## SV5 BOARD (CAPSTAN SPEED SERVO) PRINTED WIRING BOARD REF. NO. 700 SERIES

*SOLDERING SIDE*



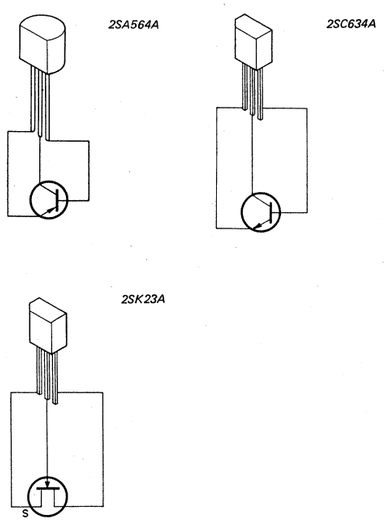
## SV5 BOARD (CAPSTAN SPEED SERVO) SCHEMATIC DIAGRAM REF. NO. 700 SERIES

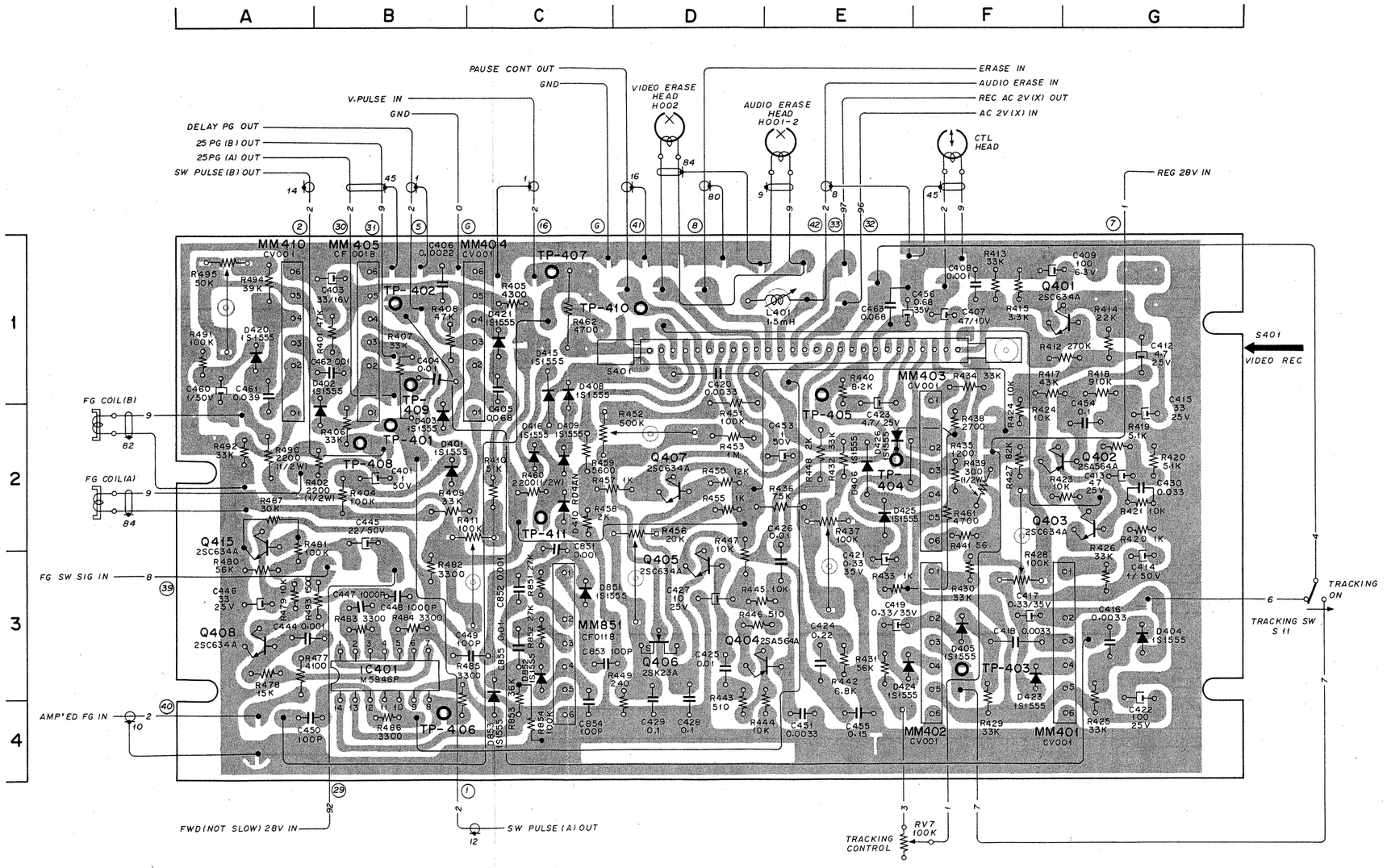


## SV4 BOARD (CAPSTAN PHASE SERVO) PRINTED WIRING BOARD REF. NO. 400 SERIES

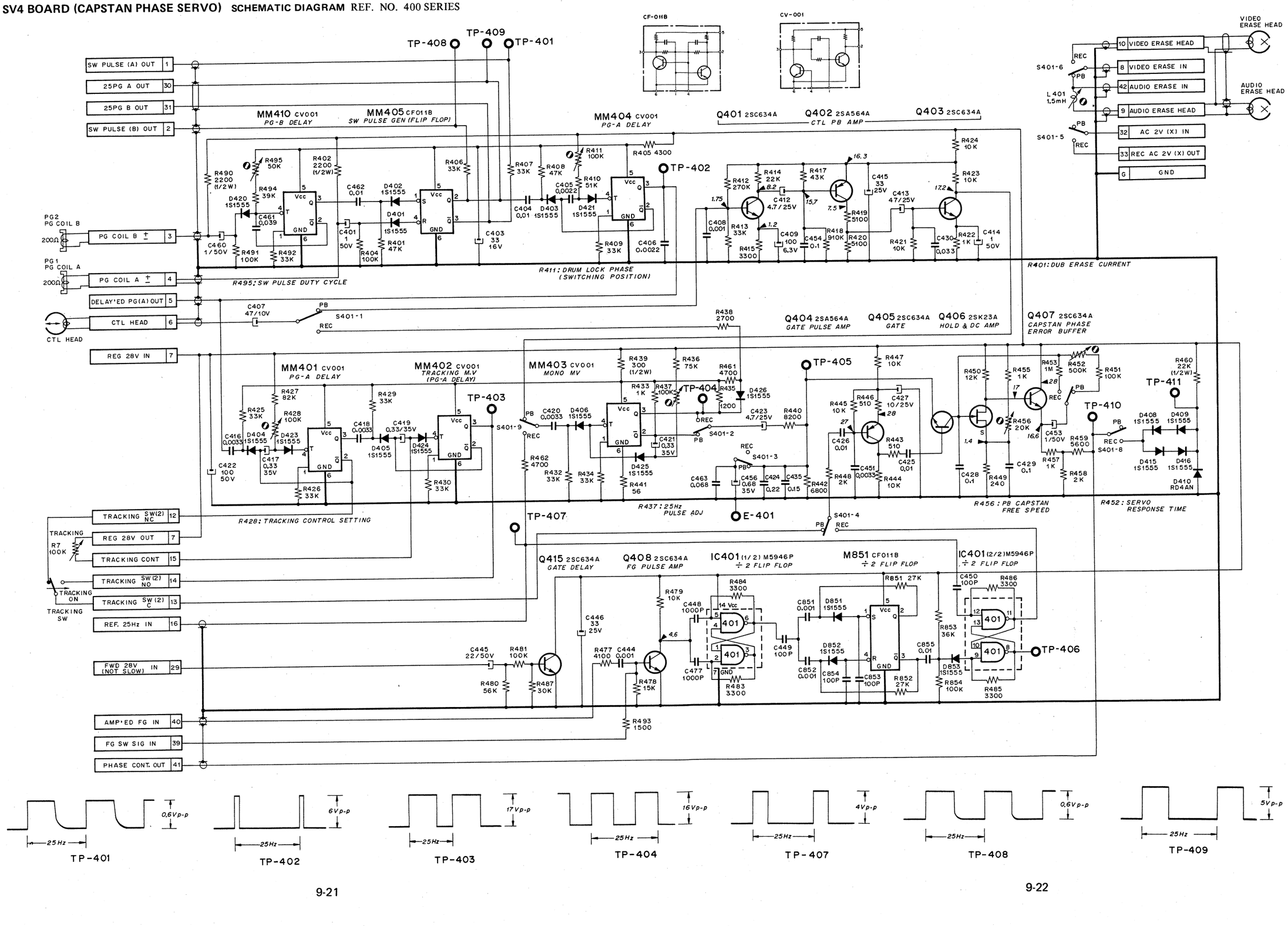
*SOLDERING SIDE*

| | | | |
|---|---|---|---|
| D401 | B - 2 | Q401 | G - 1 |
| D402 | A - 2 | Q402 | G - 2 |
| D403 | B - 2 | Q403 | G - 2 |
| D404 | G - 3 | Q404 | E - 3 |
| D405 | F - 3 | Q405 | D - 3 |
| D406 | E - 2 | Q406 | D - 3 |
| D408 | C - 2 | Q407 | D - 2 |
| D409 | C - 2 | Q408 | A - 3 |
| D410 | C - 2 | Q415 | A - 3 |
| D415 | C - 2 | | |
| D416 | C - 2 | R411 | C - 3 |
| D420 | A - 1 | R428 | F - 3 |
| D421 | C - 1 | R437 | E - 3 |
| D423 | F - 4 | R452 | D - 2 |
| D424 | F - 3 | R456 | D - 3 |
| D425 | E - 2 | R495 | A - 1 |
| D426 | E - 2 | | |
| D851 | C - 3 | L1 | E - 1 |
| D852 | C - 3 | | |
| D853 | C - 4 | TP-401 | B - 2 |
| | | TP-402 | B - 1 |
| IC401 | B - 3 | TP-403 | F - 3 |
| | | TP-404 | E - 2 |
| M401 | G - 3 | TP-405 | E - 2 |
| M402 | F - 3 | TP-406 | B - 4 |
| M403 | F - 2 | TP-407 | C - 1 |
| M404 | C - 1 | TP-408 | B - 2 |
| M405 | B - 1 | TP-409 | B - 1 |
| M410 | A - 1 | TP-410 | D - 1 |
| M851 | C - 3 | TP-411 | C - 2 |



## SV4 BOARD (CAPSTAN PHASE SERVO) SCHEMATIC DIAGRAM REF. NO. 400 SERIES



## A2 BOARD (AUDIO) PRINTED WIRING BOARD REF. NO. 500 SERIES

*SOLDERING SIDE*

C536 A - 1

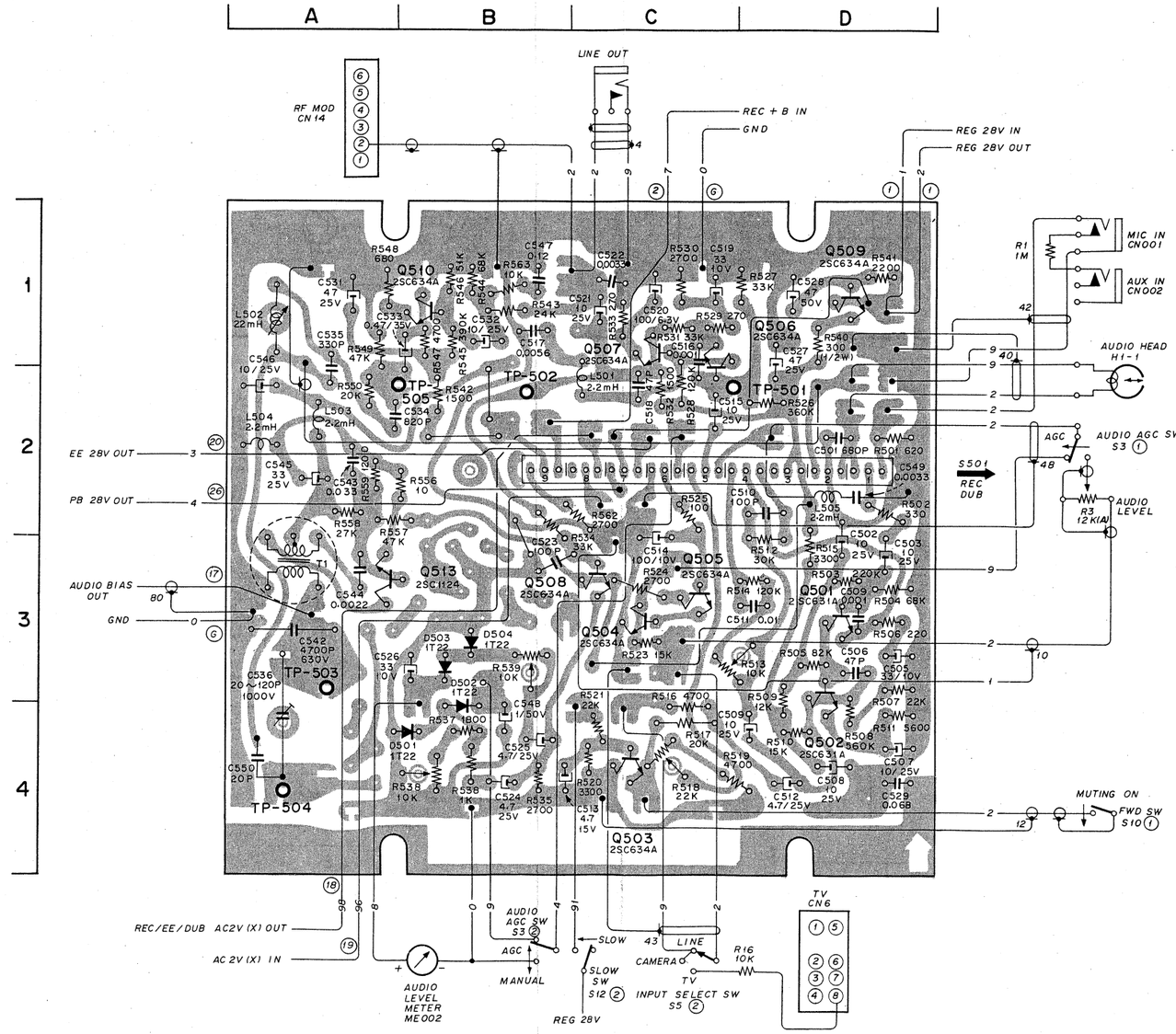
D501 B - 4
D502 B - 3
D503 B - 3
D504 B - 3

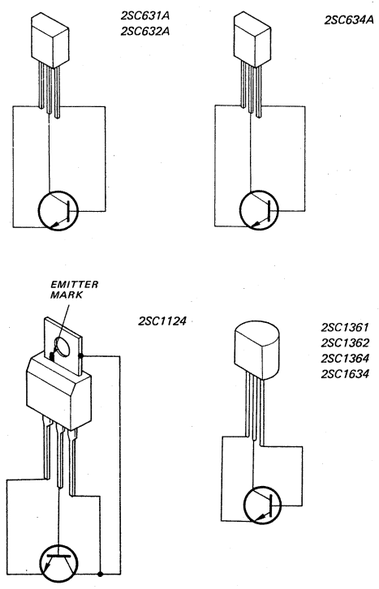
L502 A - 1

Q501 D - 3
Q502 D - 3
Q503 C - 4
Q504 C - 3
Q505 C - 3
Q506 C - 1
Q507 C - 1
Q508 C - 3
Q509 D - 1
Q510 B - 1
Q513 A - 3

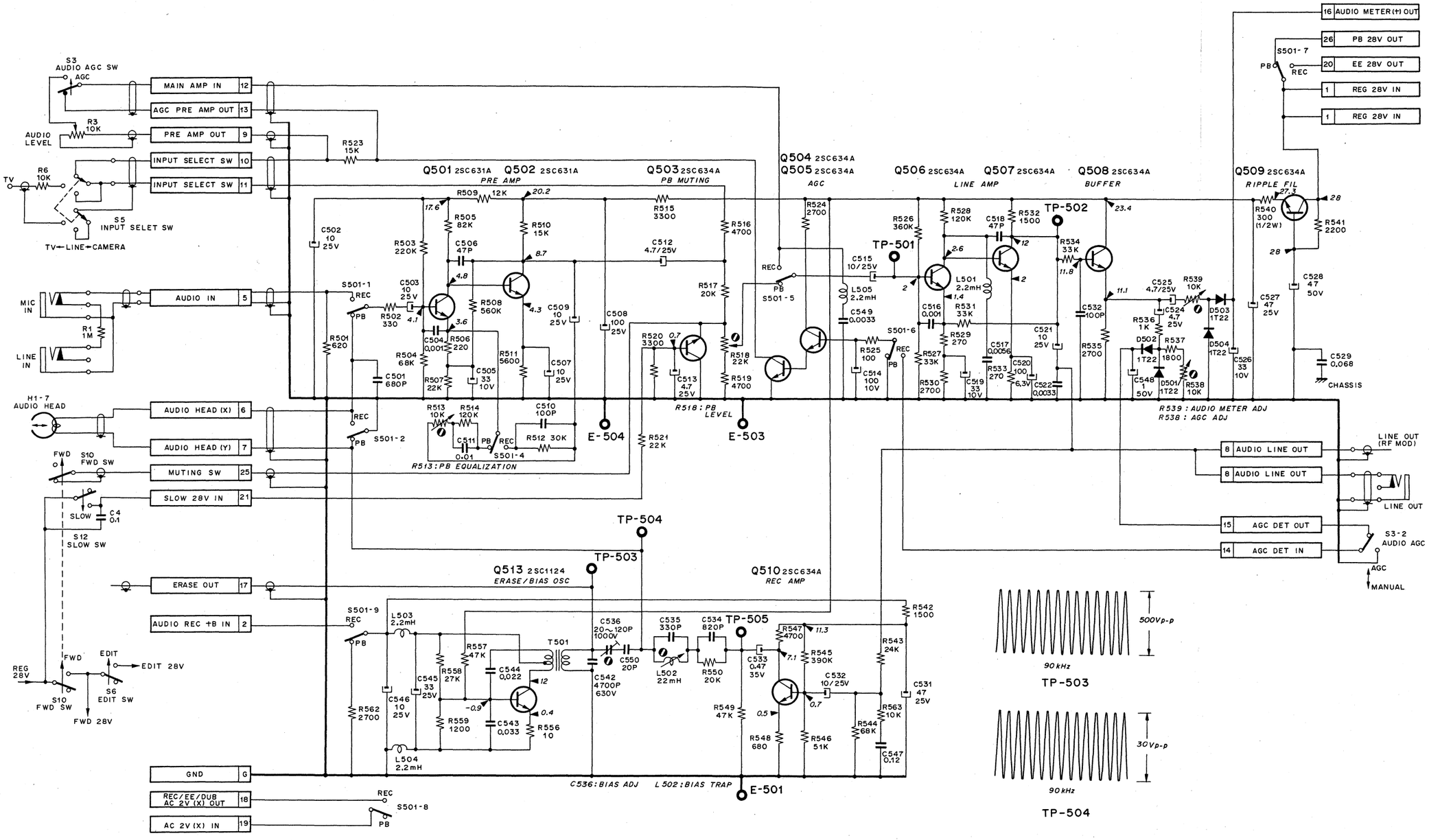
R513 D - 3
R518 C - 4
R538 B - 4
R539 B - 3

TP-501 C - 2
TP-502 B - 2
TP-503 A - 3
TP-504 A - 4
TP-505 A - 2



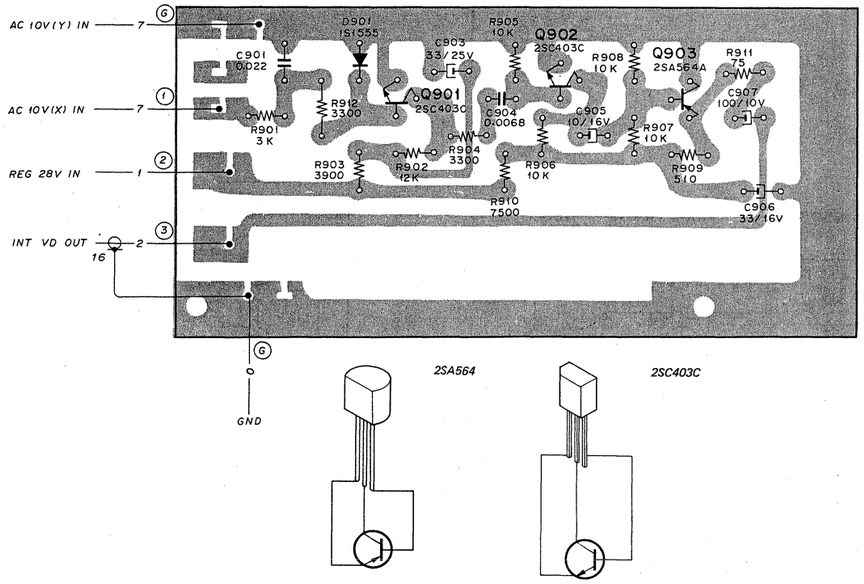



## A2 BOARD (AUDIO) SCHEMATIC DIAGRAM REF. NO. 500 SERIES

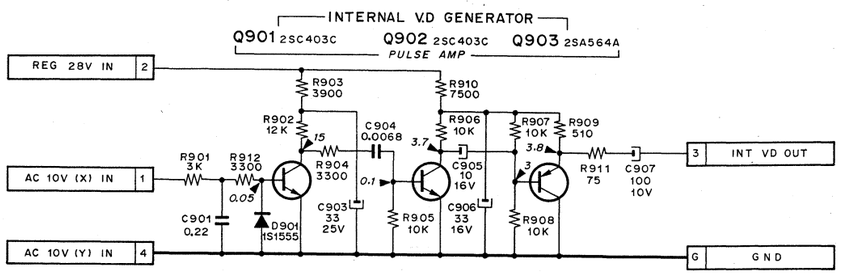


## SY3 BOARD(VERTICAL SYNC FORMER) PRINTED WIRING BOARD REF. NO. 900 SERIES

*SOLDERING SIDE*



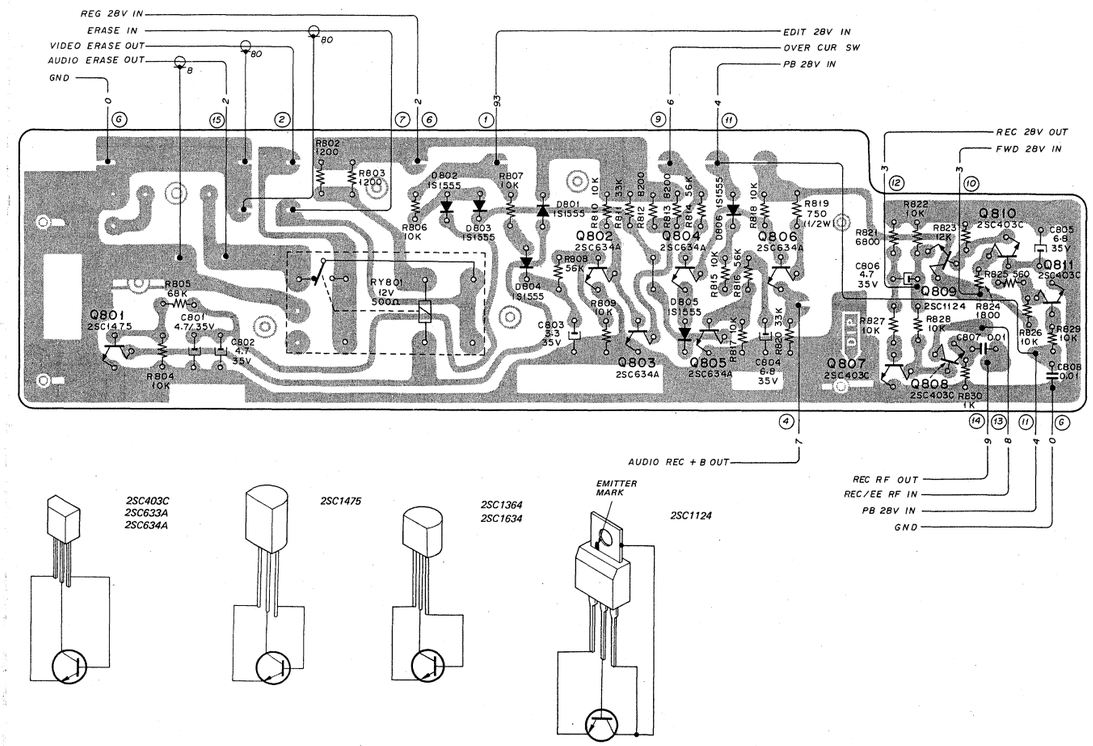

## SY3 BOARD (VERTICAL SYNC FORMER) SCHEMATIC DIAGRAM REF. NO. 900 SERIES



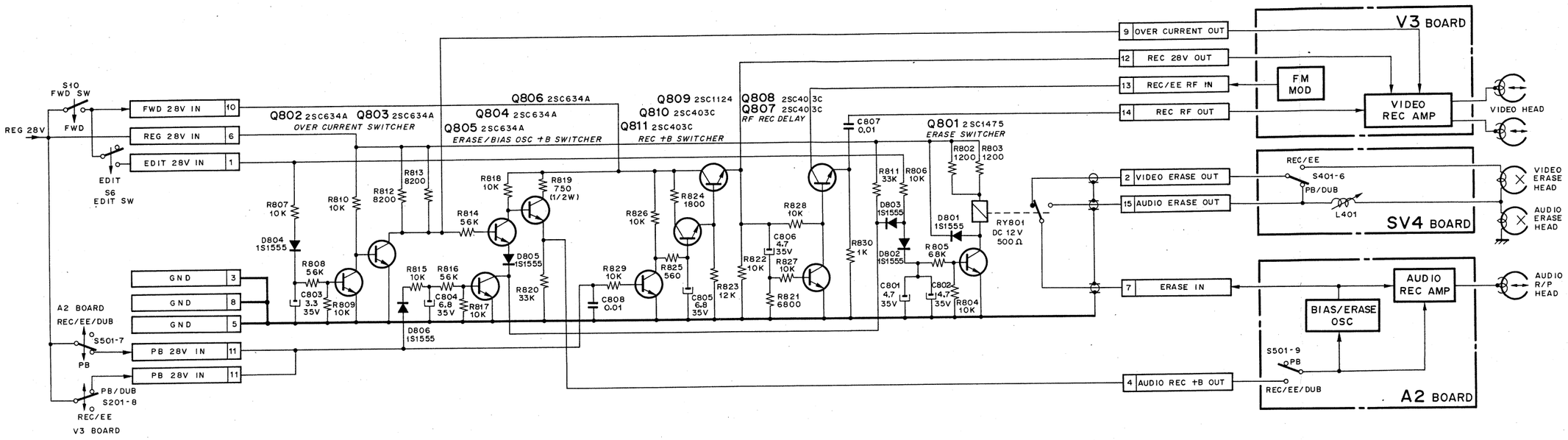


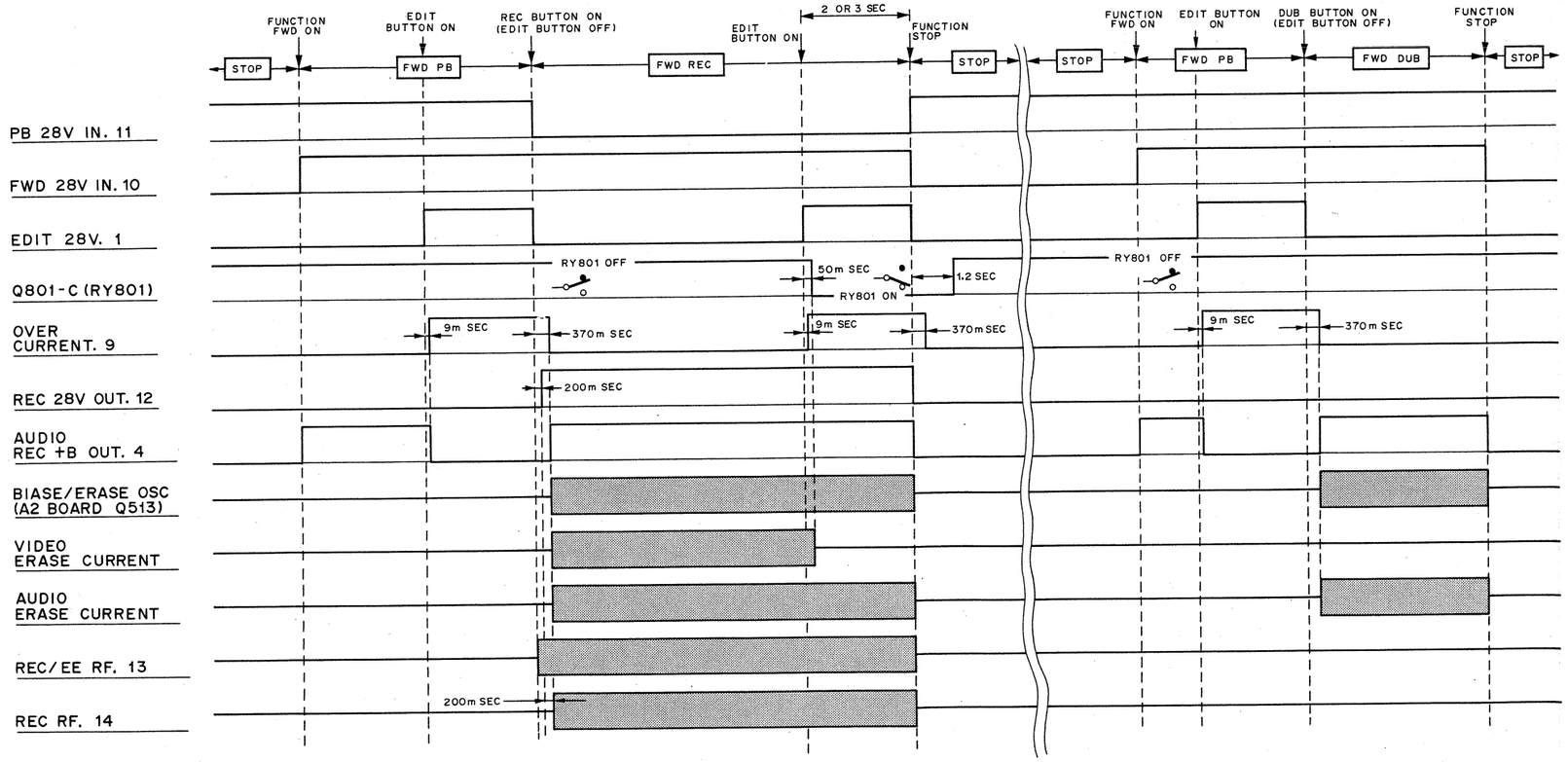

## ED6 BOARD (EDIT MODE SWITCHER) PRINTED WIRING BOARD REF. NO. 800 SERIES

*SOLDERING SIDE*



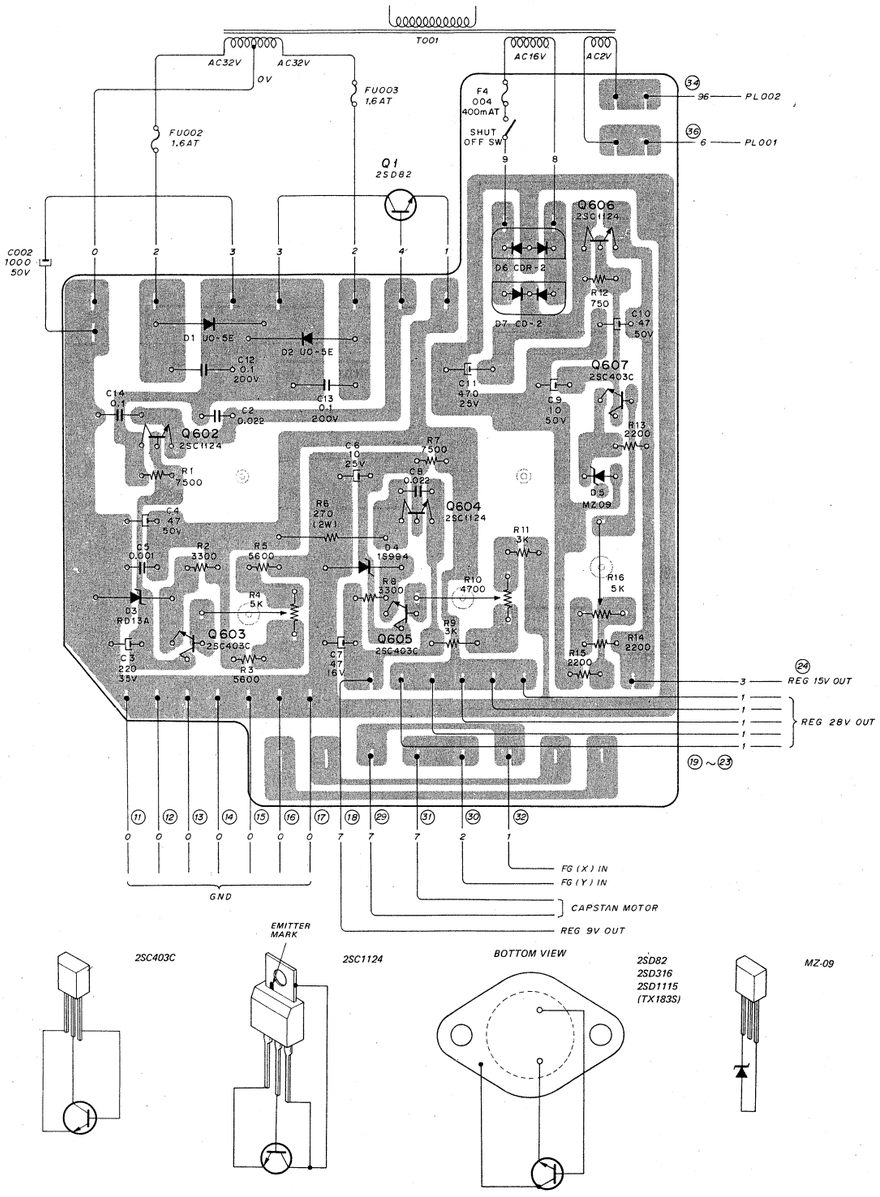
## ED6 BOARD (EDIT MODE SWITCHER) SCHEMATIC DIAGRAM REF. NO. 800 SERIES



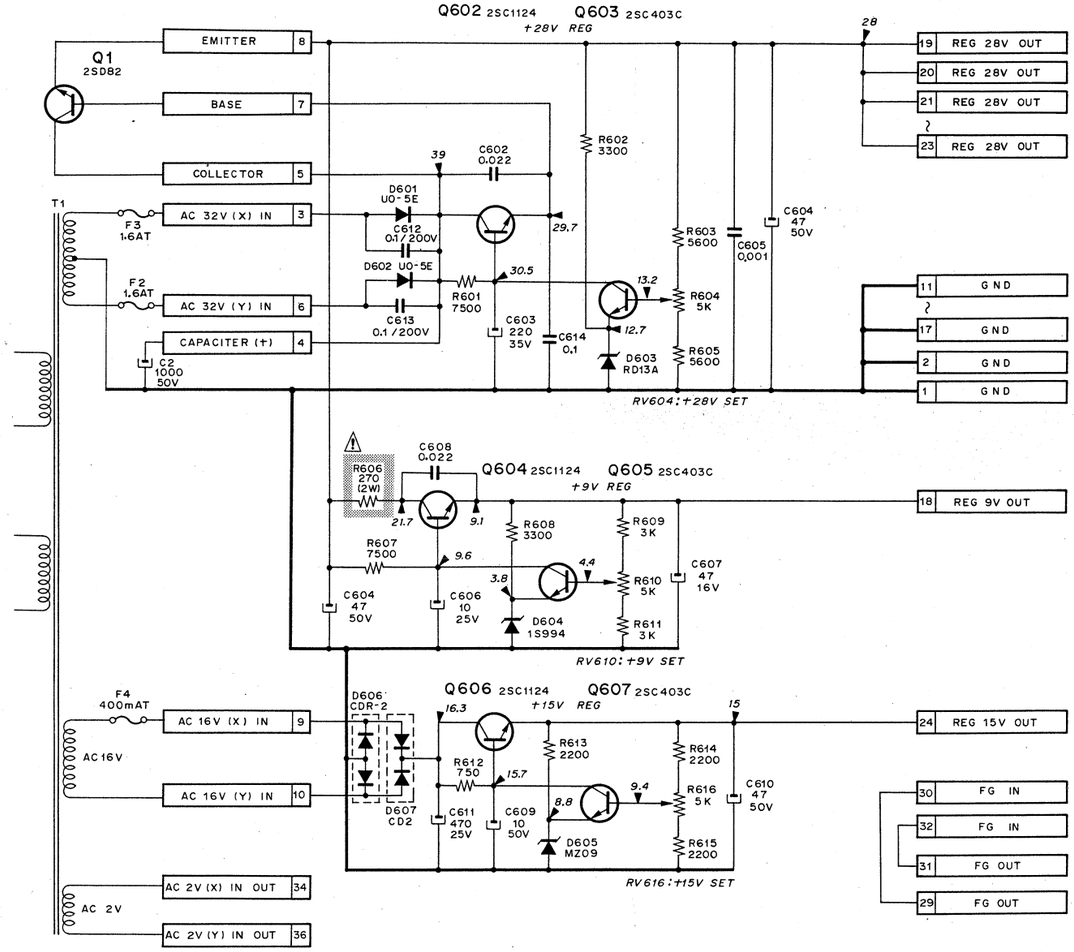
## R5 BOARD (REGULATOR) PRINTED WIRING BOARD REF. NO. 600 SERIES

*SOLDERING SIDE*





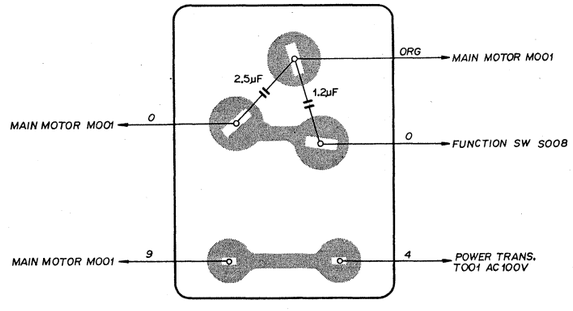

## R5 BOARD (REGULATOR) SCHEMATIC DIAGRAM REF. NO. 600 SERIES




**The shaded and ⚠-marked components are critical to safety.**
**Replace only with same component as specified.**

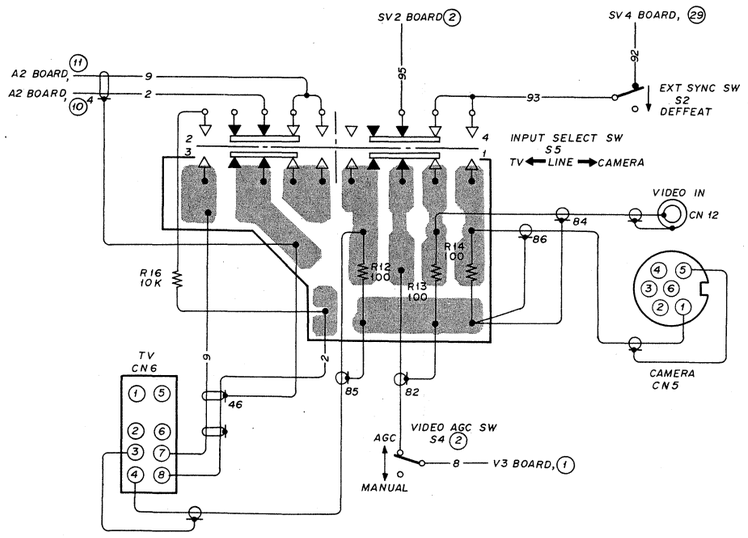
## C BOARD (PHASE SPLIT CAPACITOR) PRINTED WIRING BOARD

*SOLDERING SIDE*




## IS BOARD (INPUT SELECT SWITCH) PRINTED WIRING BOARD

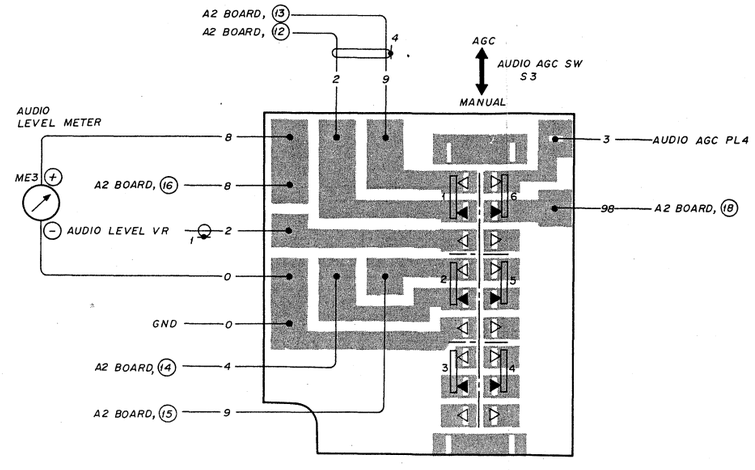
*SOLDERING SIDE*





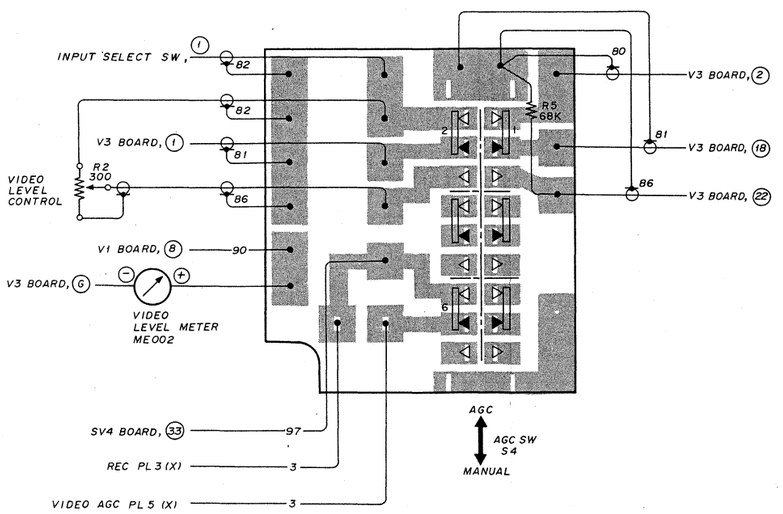

## AM1 BOARD (AUDIO AGC/MANUAL SWITCH) PRINTED WIRING BOARD

*SOLDERING SIDE*



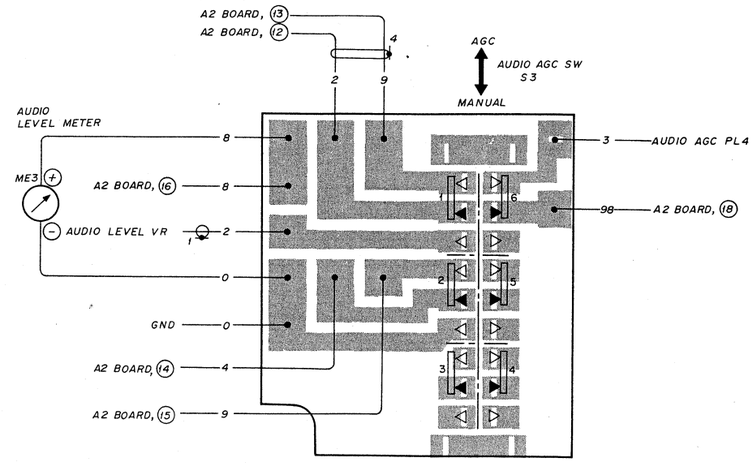

## AM2 BOARD (VIDEO AGC/MANUAL SWITCH) PRINTED WIRING BOARD

*SOLDERING SIDE*



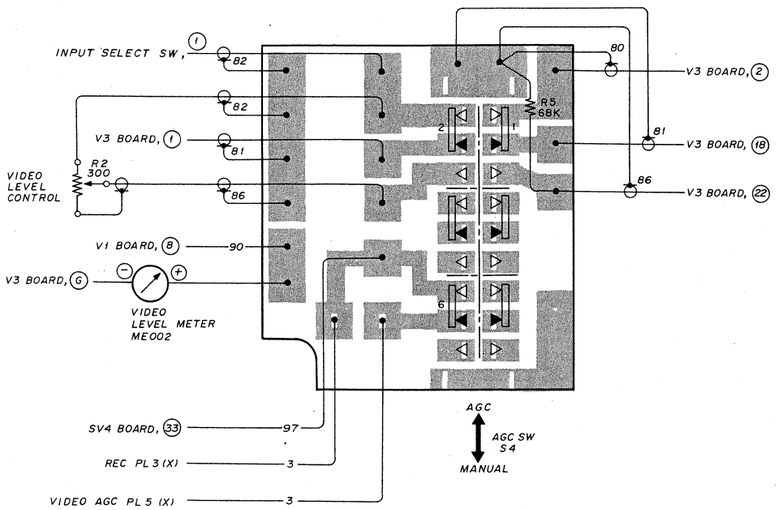
## AM1 BOARD (AUDIO AGC/MANUAL SWITCH) PRINTED WIRING BOARD

*SOLDERING SIDE*




## AM2 BOARD (VIDEO AGC/MANUAL SWITCH) PRINTED WIRING BOARD

*SOLDERING SIDE*

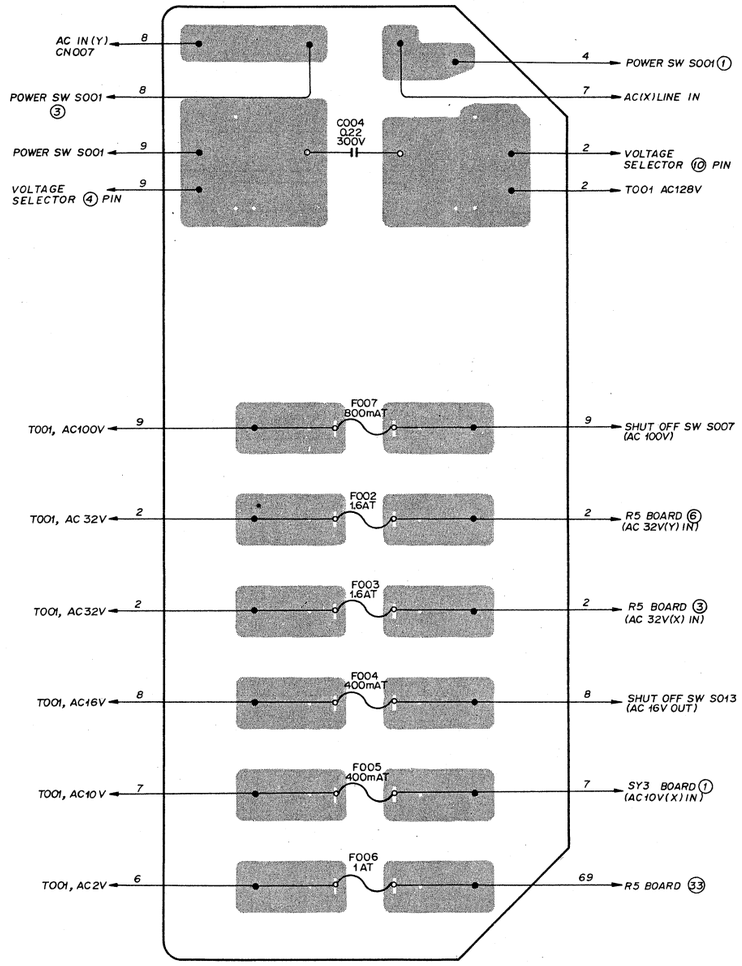






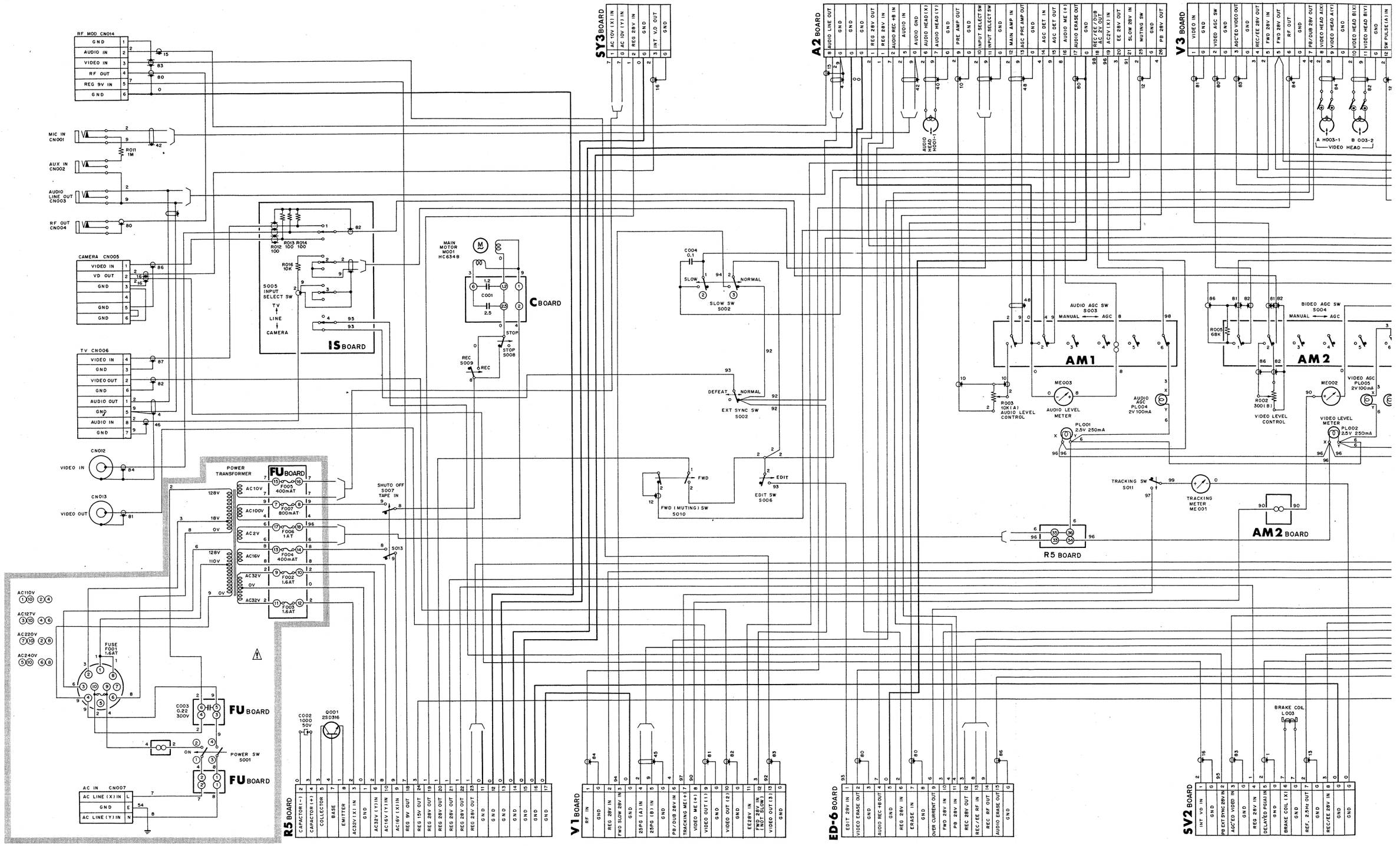

## FU BOARD (FUSE HOLDER) PRINTED WIRING BOARD

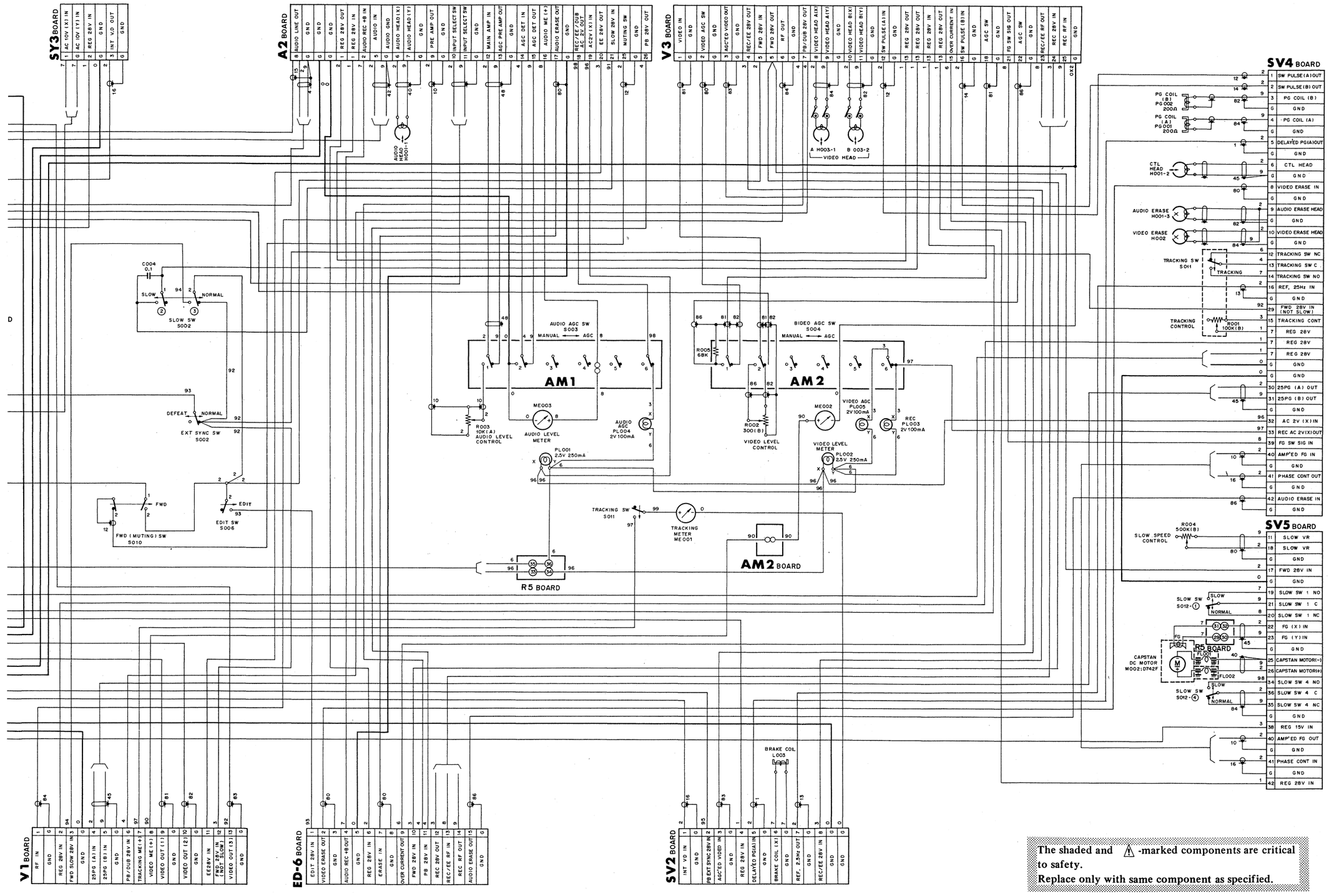
*SOLDERING SIDE*



FRAME FRAME

## FRAME WIRING






| SY3 BOARD | | | |
|---|---|---|---|
| 7 | 1 | AC 10V (X) IN | |
| 7 | G | AC 10V (Y) IN | |
| 1 | 2 | REG 28V IN | |
| 0 | G | GND | |
| 2 | 3 | INT V/D OUT | |
| 16 | G | GND | |

| A2 BOARD | | | |
|---|---|---|---|
| 15 | 8 | AUDIO LINE OUT | |
| 2,9 | G | GND | |
| 4 | G | GND | |
| 0 | G | GND | |
| 2 | 1 | REG 28V OUT | |
| 1 | 1 | REG 28V IN | |
| 7 | 2 | AUDIO REC +B IN | |
| 2 | 5 | AUDIO IN | |
| 9 | G | AUDIO GND | |
| 42 | 6 | AUDIO HEAD (X) | |
| 9 | 7 | AUDIO HEAD (Y) | |
| 40 | G | GND | |
| 2 | 9 | PRE AMP OUT | |
| 10 | G | GND | |
| 2 | 10 | INPUT SELECT SW | |
| 9 | 11 | INPUT SELECT SW | |
| 2 | G | GND | |
| 9 | 12 | MAIN AMP IN | |
| 48 | 13 | AGC PRE AMP OUT | |
| 9 | G | GND | |
| 4 | 14 | AGC DET IN | |
| 9 | 15 | AGC DET OUT | |
| 8 | 16 | AUDIO ME (+) | |
| 80 | 17 | AUDIO ERASE OUT | |
| 9 | G | GND | |
| 98 | 18 | REC/EE DUB AC 2V OUT | |
| 96 | 19 | AC2V (X) IN | |
| 3 | 20 | EE 28V OUT | |
| 91 | 21 | SLOW 28V IN | |
| 2 | 25 | MUTING SW | |
| 12 | G | GND | |
| 4 | 26 | PB 28V OUT | |

| V3 BOARD | | | |
|---|---|---|---|
| 81 | 1 | VIDEO IN | |
| 80 | G | GND | |
| 83 | 2 | VIDEO AGC SW | |
| 3 | G | GND | |
| 2 | 3 | AGC'ED VIDEO OUT | |
| 5 | G | GND | |
| 84 | 4 | REC/EE 28V OUT | |
| 6 | 5 | FWD 28V IN | |
| 4 | 5 | FWD 28V OUT | |
| 7 | 6 | RF OUT | |
| 2 | G | GND | |
| 8 | 7 | PB/DUB 28V OUT | |
| 94 | 8 | VIDEO HEAD A(X) | |
| 9 | 9 | VIDEO HEAD A(Y) | |
| 2 | G | GND | |
| 82 | 10 | VIDEO HEAD B(X) | |
| 9 | 11 | VIDEO HEAD B(Y) | |
| 2 | G | GND | |
| 12 | 12 | SW PULSE (A) IN | |
| 1 | G | GND | |
| 1 | 13 | REG 28V OUT | |
| 1 | 13 | REG 28V IN | |
| 1 | 13 | REG 28V OUT | |
| 6 | 15 | OVER CURRENT IN | |
| 2 | 16 | SW PULSE (B) IN | |
| 14 | G | GND | |
| 81 | 18 | AGC SW | |
| 8 | G | GND | |
| 86 | 21 | FG SW SIG OUT | |
| 8 | 22 | AGC SW | |
| | G | GND | |
| 3 | 23 | REC/EE RF OUT | |
| 9 | 24 | REC 28V IN | |
| OX2 | 25 | REC RF IN | |
| | G | GND | |

| SV4 BOARD | | |
|---|---|---|
| 1 | 1 | SW PULSE (A) OUT |
| 2 | 2 | SW PULSE (B) OUT |
| 9 | 3 | PG COIL (B) |
| | G | GND |
| 9 | 4 | PG COIL (A) |
| | G | GND |
| 1 | 5 | DELAYED PG(A) OUT |
| | G | GND |
| 45 | 6 | CTL HEAD |
| | G | GND |
| 80 | 8 | VIDEO ERASE IN |
| | G | GND |
| 82 | 9 | AUDIO ERASE HEAD |
| | G | GND |
| 84 | 10 | VIDEO ERASE HEAD |
| | G | GND |
| 6 | 12 | TRACKING SW NC |
| 4 | 13 | TRACKING SW C |
| 7 | 14 | TRACKING SW NO |
| 13 | 16 | REF. 25Hz IN |
| | G | GND |
| 92 | 29 | FWD 28V IN (NOT SLOW) |
| 3 | 15 | TRACKING CONT |
| 1 | 7 | REG 28V |
| 1 | 7 | REG 28V |
| 1 | 7 | REG 28V |
| 0 | G | GND |
| 0 | G | GND |
| 45 | 30 | 25PG (A) OUT |
| 45 | 31 | 25PG (B) OUT |
| | G | GND |
| 96 | 32 | AC 2V (X) IN |
| 97 | 33 | REC AC 2V (X) OUT |
| 8 | 39 | FG SW SIG IN |
| 10 | 40 | AMP'ED FG IN |
| | G | GND |
| 16 | 41 | PHASE CONT OUT |
| | G | GND |
| 86 | 42 | AUDIO ERASE IN |
| | G | GND |

| SV5 BOARD | | |
|---|---|---|
| 9 | 11 | SLOW VR |
| 2 | 18 | SLOW VR |
| 80 | G | GND |
| 2 | 17 | FWD 28V IN |
| 0 | G | GND |
| 7 | 19 | SLOW SW 1 NO |
| 9 | 21 | SLOW SW 1 C |
| 8 | 20 | SLOW SW 1 NC |
| 2 | 22 | FG (X) IN |
| 9 | 23 | FG (Y) IN |
| 45 | G | GND |
| 40 | 25 | CAPSTAN MOTOR(-) |
| 9 | 26 | CAPSTAN MOTOR(+) |
| 2 | 34 | SLOW SW 4 NO |
| 98 | 36 | SLOW SW 4 C |
| 2 | 35 | SLOW SW 4 NC |
| 9 | G | GND |
| 84 | 38 | REG 15V IN |
| 3 | 40 | AMP'ED FG OUT |
| 2 | G | GND |
| 10 | 41 | PHASE CONT IN |
| 16 | G | GND |
| 2 | 42 | REG 28V IN |
| 1 | | |

| V1 BOARD | | | |
|---|---|---|---|
| 84 | 1 | RF IN | |
| | G | GND | |
| 94 | 2 | REG 28V IN | |
| 0 | 3 | FWD SLOW 28V IN | |
| | G | GND | |
| 2 | 4 | 25PG (A) IN | |
| 9 | 5 | 25PG (B) IN | |
| 45 | G | GND | |
| 4 | 6 | PB/DUB 28V IN | |
| 97 | 7 | TRACKING ME (+) | |
| 90 | 8 | VIDEO ME (+) | |
| 8 | 9 | VIDEO OUT (1) | |
| 61 | G | GND | |
| 9 | 10 | VIDEO OUT (2) | |
| 82 | G | GND | |
| 10 | 11 | EE 28V IN | |
| 83 | 12 | FWD 28V IN (NOT SLOW) | |
| 3 | 13 | VIDEO OUT (3) | |
| 32 | G | GND | |

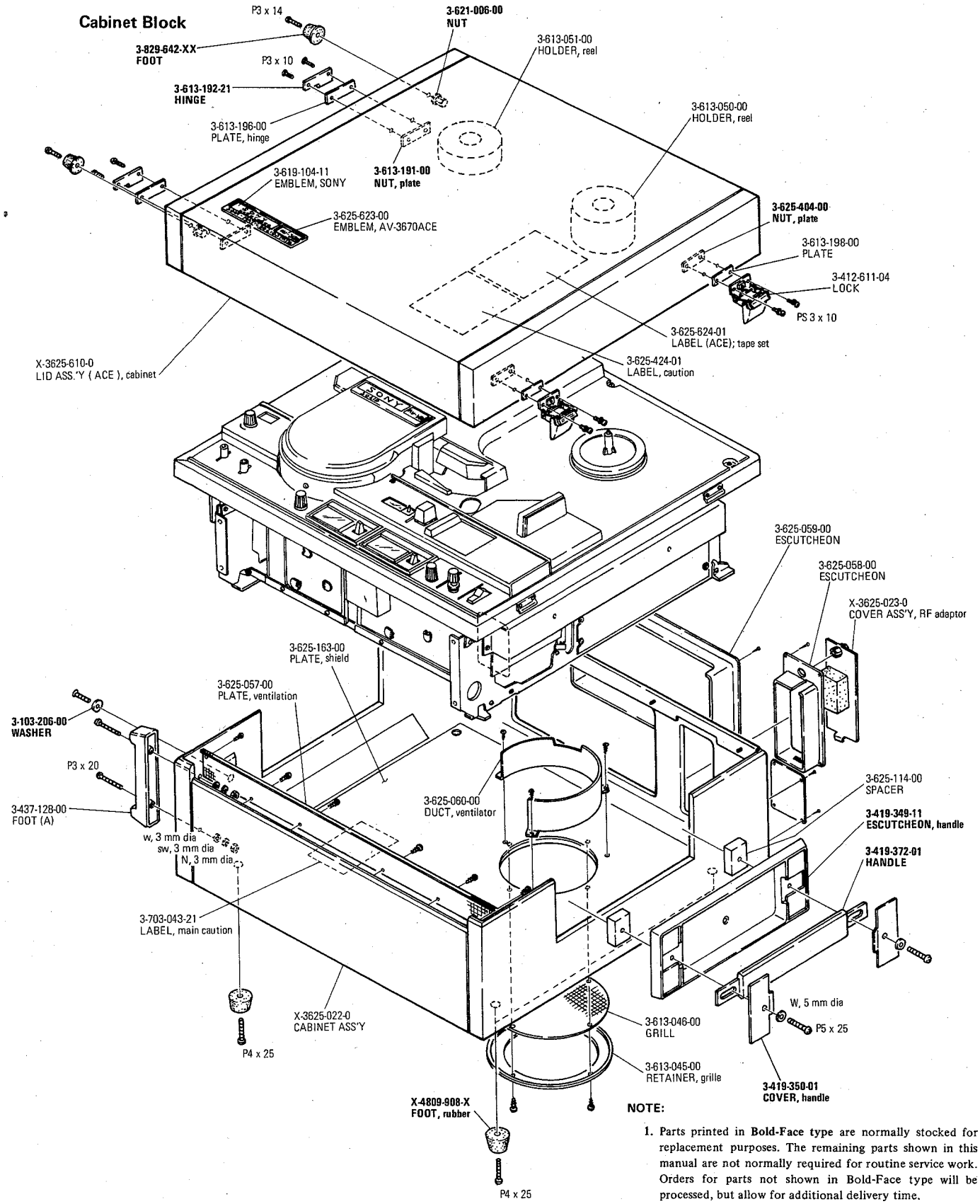
| ED-6 BOARD | | | |
|---|---|---|---|
| 93 | 1 | EDIT 28V IN | |
| 80 | 2 | VIDEO ERASE OUT | |
| 3 | G | GND | |
| 7 | 4 | AUDIO REC +B OUT | |
| 0 | G | GND | |
| 5 | 6 | REG 28V IN | |
| 2 | 7 | ERASE IN | |
| 80 | G | GND | |
| 8 | 8 | OVER CURRENT OUT | |
| 6 | 9 | FWD 28V IN | |
| 3 | 10 | PB 28V IN | |
| 4 | 11 | REC 28V OUT | |
| 3 | 12 | REC/EE RF IN | |
| 8 | 13 | REC RF OUT | |
| 9 | 14 | AUDIO ERASE OUT | |
| 86 | 15 | GND | |
| | G | | |

| SV2 BOARD | | | |
|---|---|---|---|
| 2 | 1 | INT V/D IN | |
| 16 | G | GND | |
| 95 | 2 | PB EXT SYNC 28V IN | |
| 83 | 3 | AGC'ED VIDEO IN | |
| 1 | G | GND | |
| 4 | 4 | REG 28V IN | |
| 2 | 5 | DELAYED PG(A) IN | |
| 1 | G | GND | |
| 6 | 6 | BRAKE COIL (X) | |
| 7 | G | GND | |
| 6 | 7 | REF. 2.5Hz OUT | |
| 2 | G | GND | |
| 7 | 8 | REC/EE 28V IN | |
| 3 | G | GND | |
| 0 | G | GND | |
| 0 | G | GND | |

The shaded and ⚠ -marked components are critical to safety.
Replace only with same component as specified.

# SECTION 10
# SPARE PARTS AND JIG

## 10-1. EXPLODED VIEW

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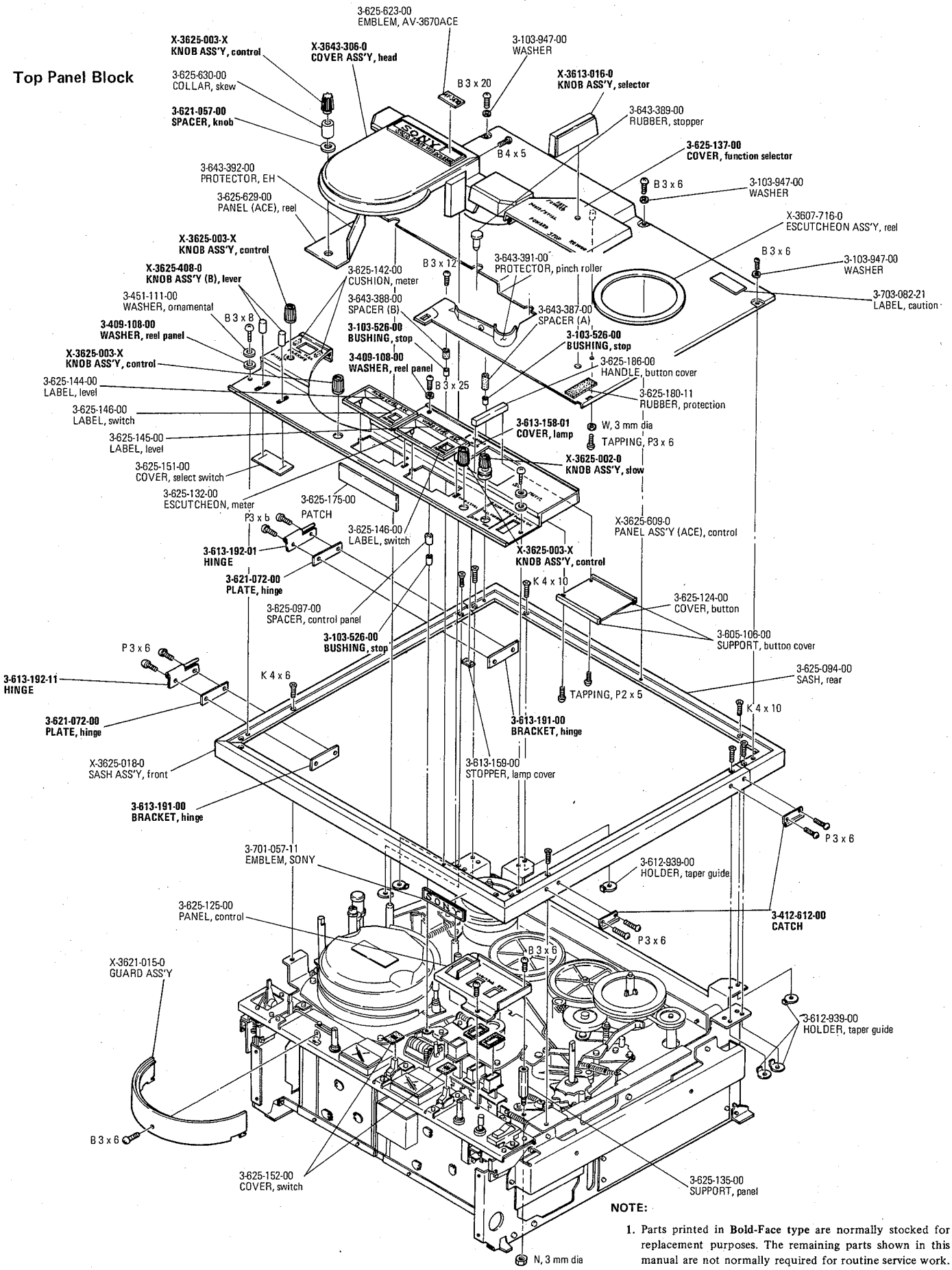
## Top Panel Block

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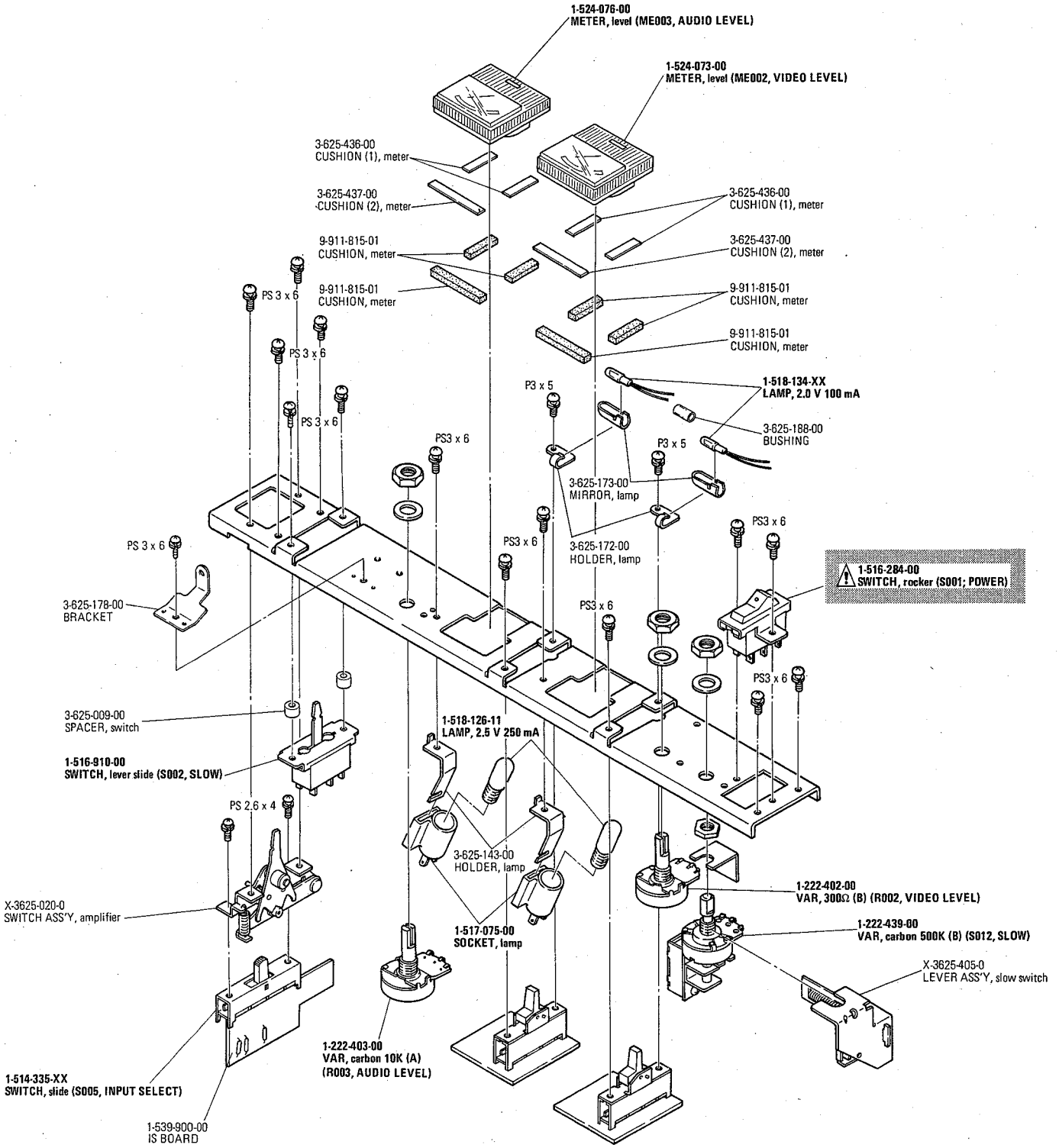
## Control Panel Block

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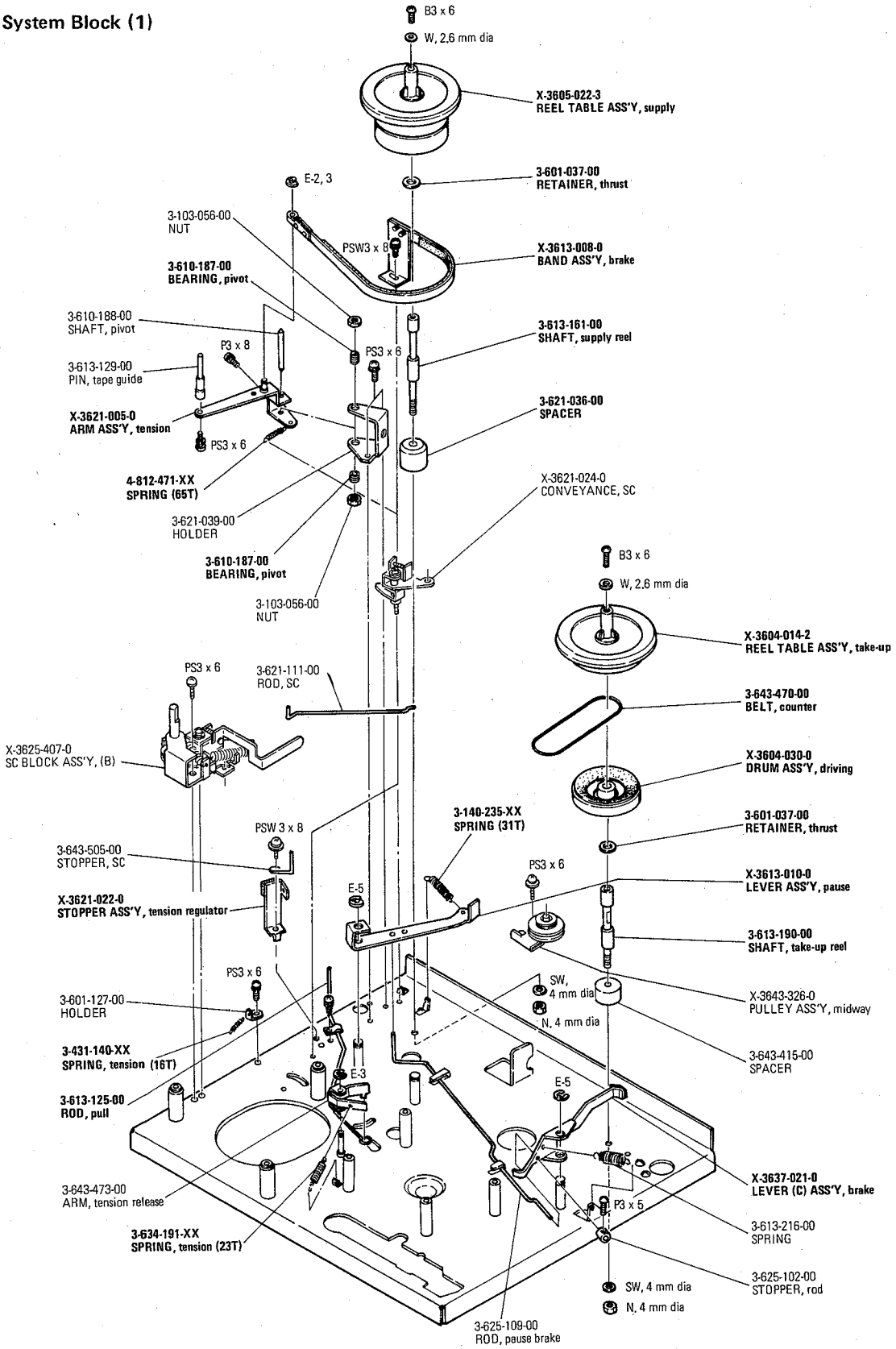
## Driving System Block (1)

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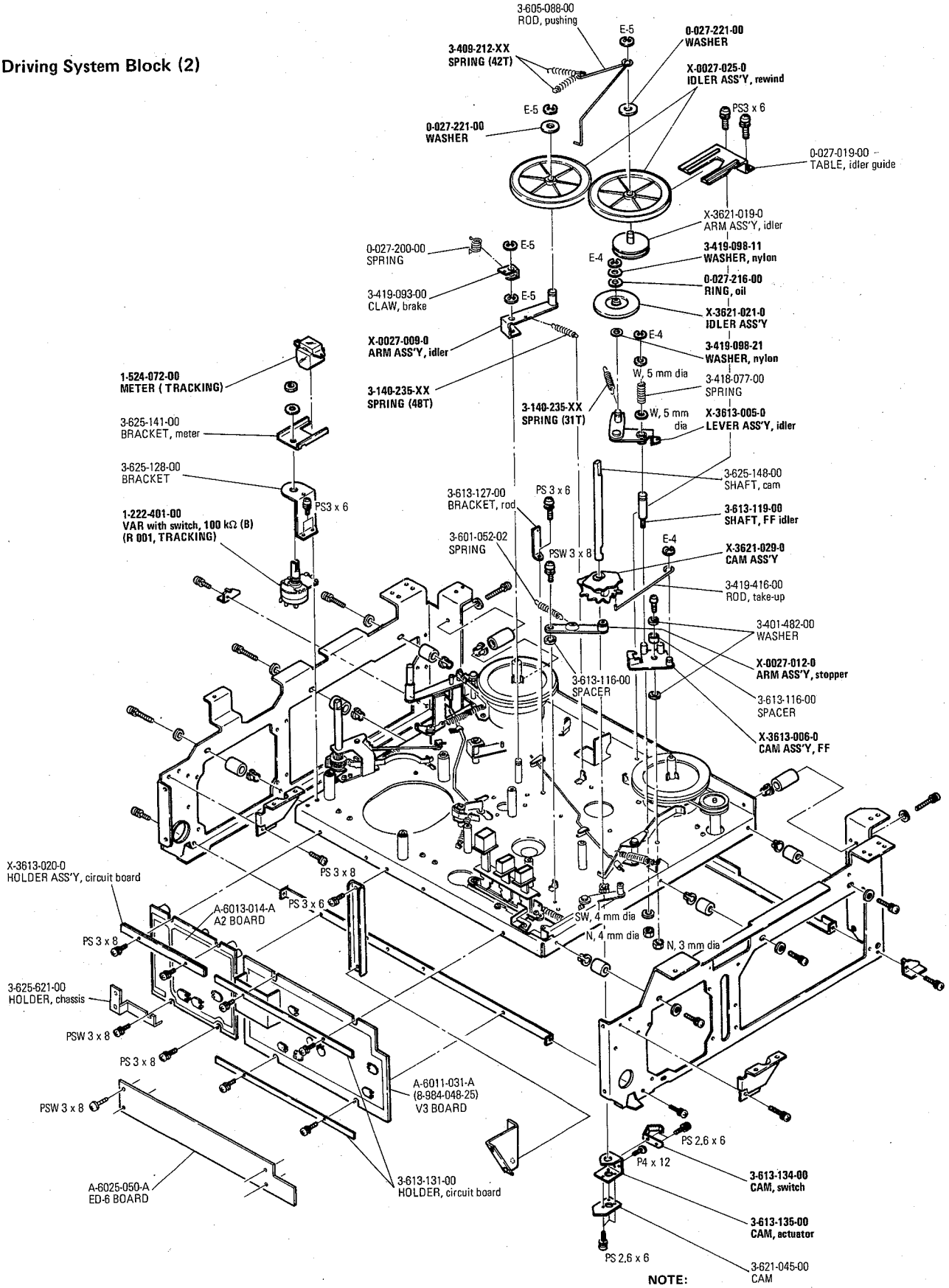
## Driving System Block (2)

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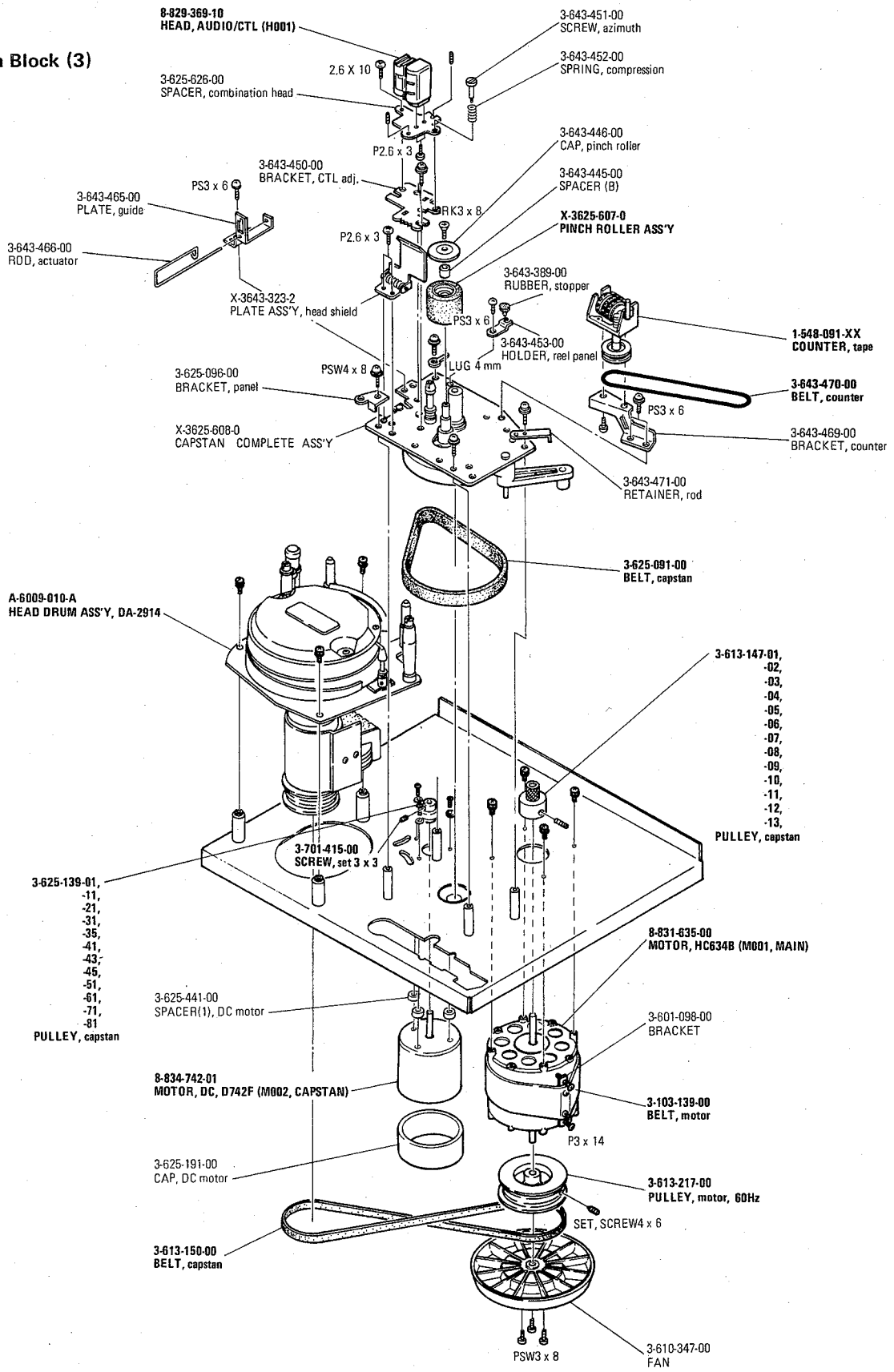


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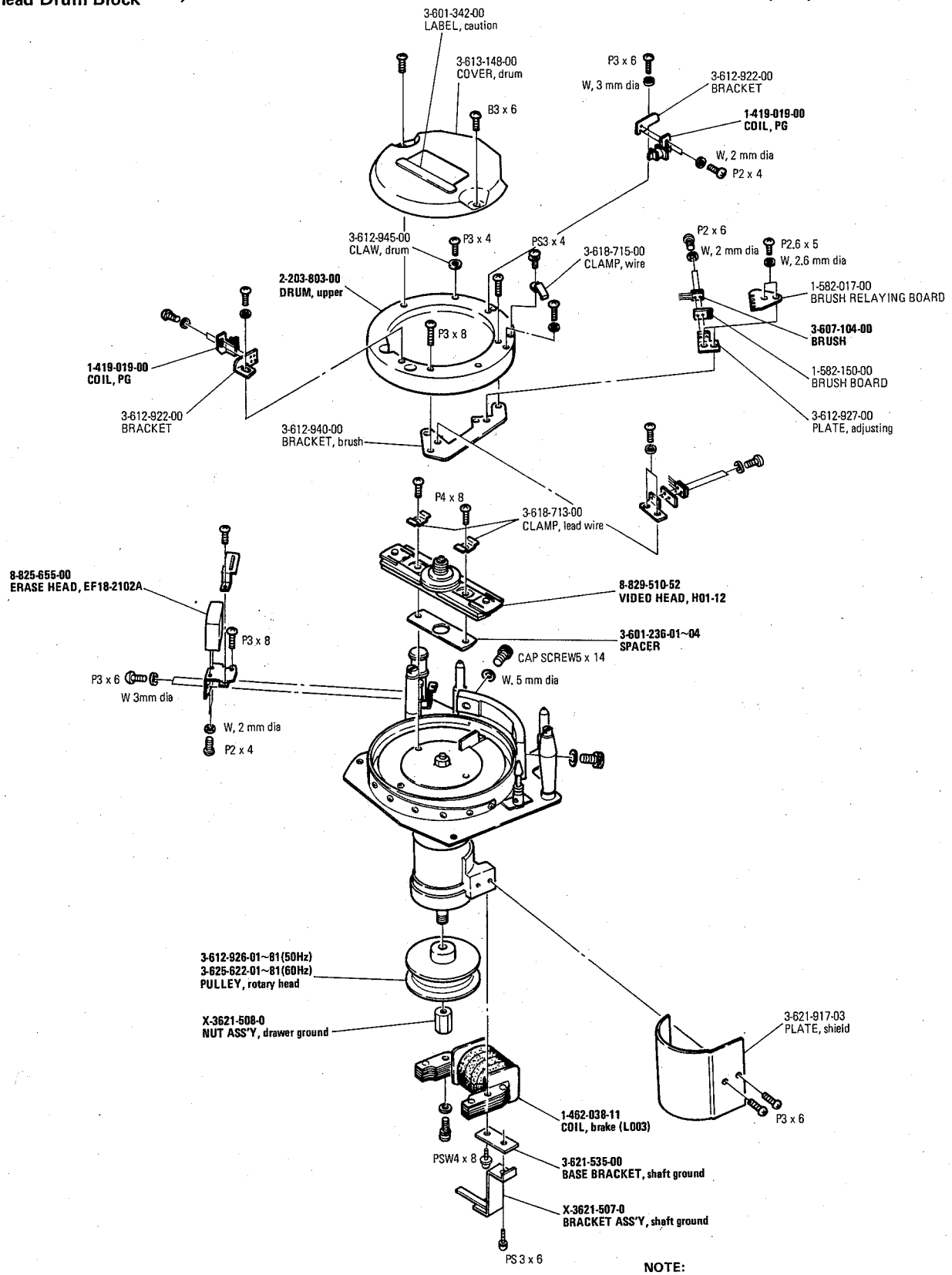
## Head Drum Block

A-6009-010-A HEAD DRUM ASS'Y, DA-2914

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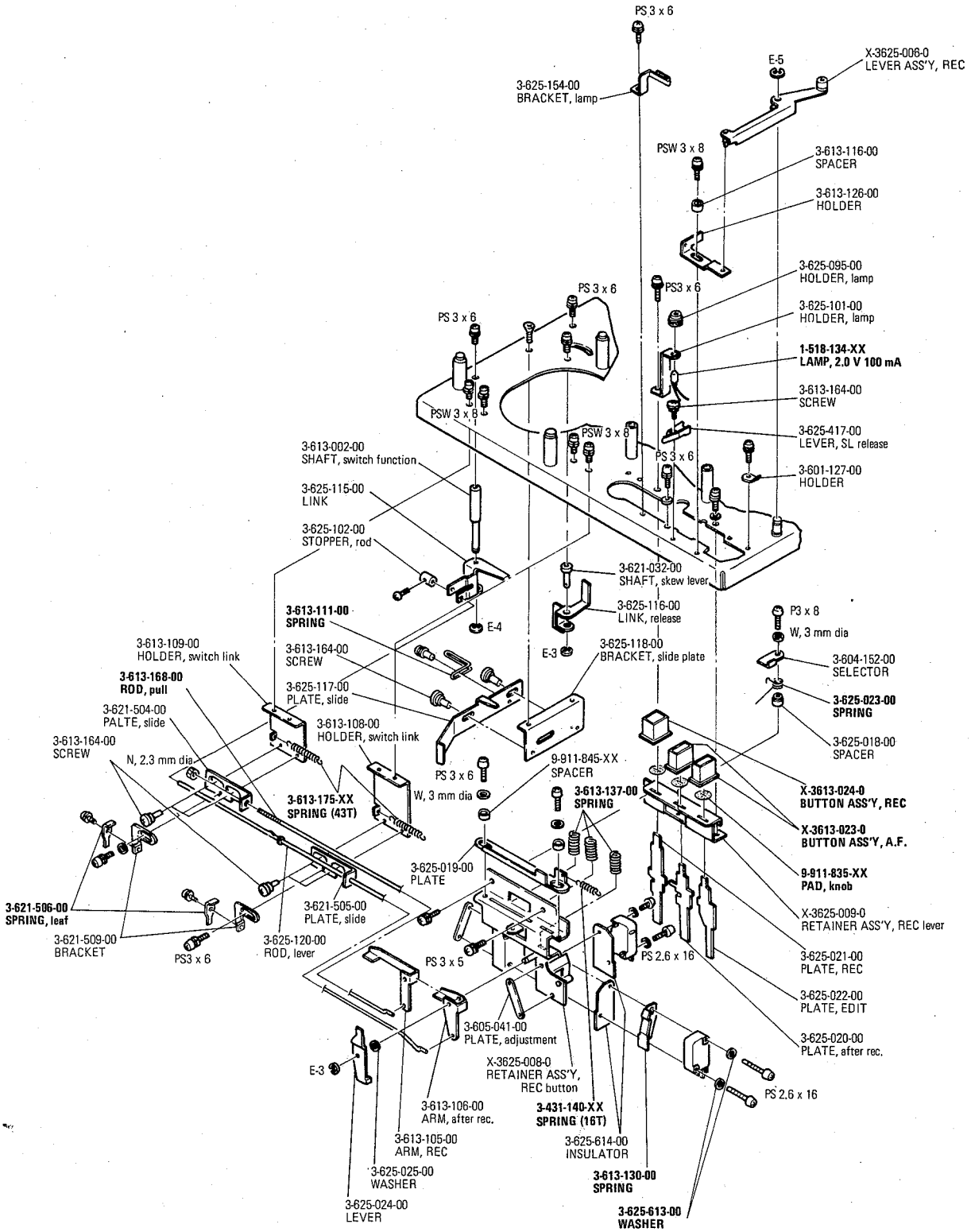
## Function Block

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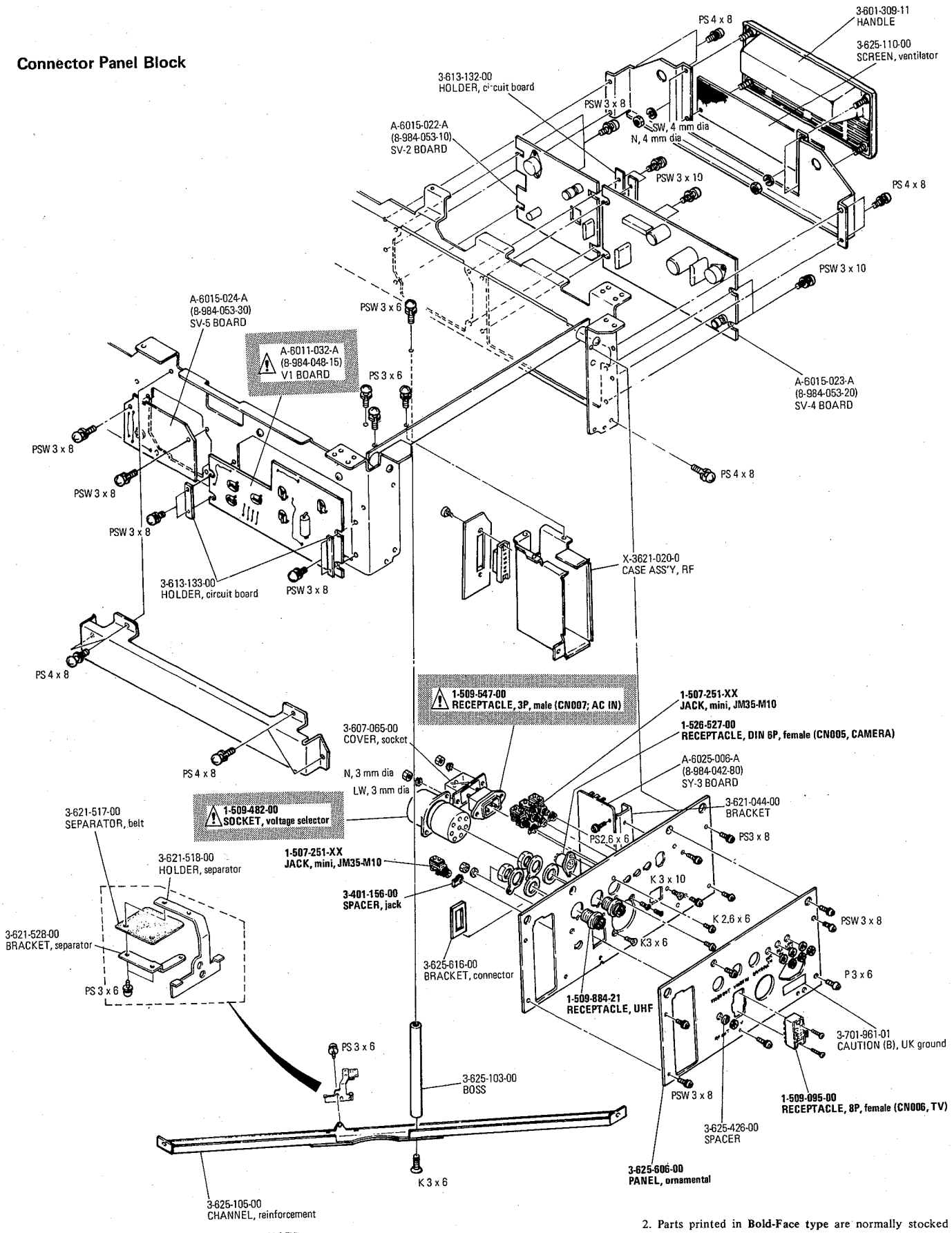
## Connector Panel Block

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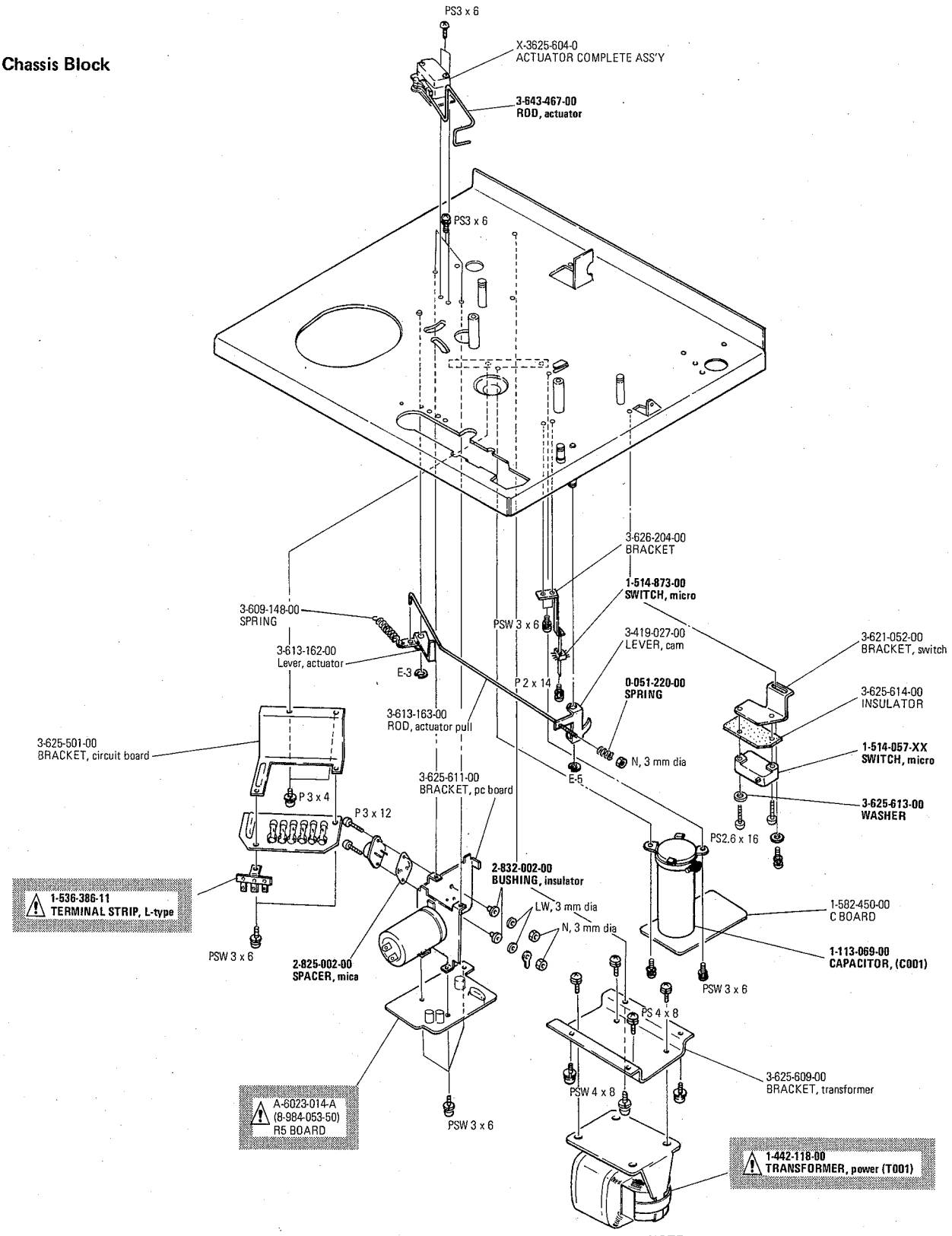
## Chassis Block

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## 10-2. ELECTRICAL SPARE PARTS

### MOUNTED BOARD

| Ref. No. | Parts No. | Description |
|---|---|---|
| | A-6013-014-A | A2 board |
| | A-6025-050-A | ED6 board |
| ⚠ | A-6023-014-A (8-984-053-50) | R5 board |
| | A-6025-006-A (8-984-042-80) | SY3 board |
| | A-6015-022-A (8-984-053-10) | SV2 board |
| | A-6015-023-A (8-984-053-20) | SV4 board |
| | A-6015-024-A (8-984-053-30) | SV5 board |
| ⚠ | A-6011-032-A (8-984-048-15) | V1 board |
| | A-6011-031-A (8-984-048-25) | V3 board |

### PRINTED WIRING BOARD

| Ref. No. | Parts No. | Description |
|---|---|---|
| | 1-582-383-00 | AM1 board |
| | 1-582-384-00 | AM2 board |
| | 1-582-150-00 | Brush board |
| | 1-582-017-00 | Brush relaying board |
| | 1-582-450-00 | C board |
| | 1-539-900-00 | IS board |
| | 1-581-819-11 | SY7 board |

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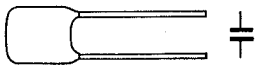
## CAPACITOR

**Parts that are not listed in the "reference numbers order list" are shown in following table.**
**Reference numbers are omitted.**

**MYLAR CAPACITOR** 0.001μF through 0.22μF
±10% 50WV



Parts No. 1-108-□□□-00

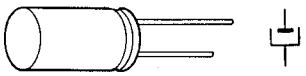
| Value | Parts No. −□□□− |
|---|---|
| 0.001μF | 227 |
| 0.0012 | 351 |
| 0.0015 | 228 |
| 0.0018 | 352 |
| 0.0022 | 230 |
| 0.0027 | 353 |
| 0.0033 | 232 |
| 0.0039 | 354 |

| Value | Parts No. −□□□− |
|---|---|
| 0.0047μF | 234 |
| 0.0056 | 355 |
| 0.0068 | 237 |
| 0.0082 | 356 |
| 0.01 | 239 |
| 0.012 | 357 |
| 0.015 | 240 |
| 0.018 | 358 |

| Value | Parts No. −□□□− |
|---|---|
| 0.022μF | 242 |
| 0.027 | 359 |
| 0.033 | 244 |
| 0.039 | 360 |
| 0.047 | 246 |
| 0.056 | 361 |
| 0.068 | 249 |
| 0.082 | 362 |

| Value | Parts No. −□□□− |
|---|---|
| 0.1μF | 251 |
| 0.12 | 363 |
| 0.15 | 252 |
| 0.18 | 364 |
| 0.22 | 254 |
| | |
| | |
| | |

**ELECTROLYTIC CAPACITOR** 0.47μF through 470μF
6.3WV through 50 (63, 100)WV



Parts No. 1-123-□□□-00

| Value | | Parts No. −□□□− |
|---|---|---|
| 0.47μF | 50V | |
| | 100 | 379 |
| 1 | 50 | |
| | 100 | 380 |
| 2.2 | 50 | |
| | 100 | 381 |
| 3.3 | 25 | |
| | 35 | |
| | 50 | |
| | 100 | 382 |
| 4.7 | 25 | |
| | 35 | |
| | 50 | |
| | 63 | 369 |
| 10 | 10 | |
| | 16 | |
| | 25 | |
| | 35 | |
| | 50 | 356 |
| 22 | 16 | |
| | 25 | 330 |

| Value | | Parts No. −□□□− |
|---|---|---|
| 22μF | 35V | 342 |
| | 50 | |
| | 63 | 371 |
| 33 | 6.3 | |
| | 10 | |
| | 16 | 318 |
| | 25 | |
| | 35 | 343 |
| | 50 | |
| | 63 | 372 |
| 47 | 6.3 | |
| | 10 | 306 |
| | 16 | |
| | 25 | 332 |
| | 35 | |
| | 50 | 359 |
| 100 | 6.3 | |
| | 10 | 307 |
| | 16 | |
| | 25 | 333 |
| | 35 | 345 |

| Value | | Parts No. −□□□− |
|---|---|---|
| 100μF | 50V | 360 |
| 220 | 6.3 | |
| | 10 | 308 |
| | 16 | 321 |
| | 25 | 334 |
| | 35 | 346 |
| | 50 | 361 |
| 330 | 6.3 | |
| | 10 | 309 |
| | 16 | 322 |
| | 25 | 335 |
| | 35 | 347 |
| | 50 | 362 |
| 470 | 6.3 | 298 |
| | 10 | 310 |
| | 16 | 323 |
| | 25 | 336 |
| | 35 | 348 |
| | 50 | |
| | 63 | 377 |

| Ref. No. | Parts No. | Description | | | |
|---|---|---|---|---|---|
| **frame** | | | | | |
| C001 | 1-113-069-00 | paper | 2.5μF + 1.2μF | | 250V |
| ⚠C003 | 1-108-745-00 | mylar | 0.22 | 20% | 300V |
| **SV2 board** | | | | | |
| C103 | 1-102-114-00 | ceramic | 470pF(B) | | 50V |
| C115 | 1-131-215-21 | tantalum | 1 | 10% | 35V |
| C117 | 1-131-215-21 | tantalum | 1 | 10% | 35V |
| C104 | 1-131-211-00 | tantalum | 0.22 | 10% | 35V |
| **V3 board** | | | | | |
| C201 | 1-107-173-00 | mica | 150pF | 5% | 500V |
| C209 | 1-131-217-00 | tantalum | 2.2 | 10% | 35V |
| C212 | 1-107-165-00 | mica | 56pF | 5% | 500V |
| C217 | 1-130-015-00 | polypropylene | 560pF | 10% | 50V |
| C222 | 1-107-165-00 | mica | 56pF | 5% | 500V |
| C223 | 1-107-163-00 | mica | 47pF | 5% | 500V |
| C230 | 1-131-215-00 | tantalum | 1 | 10% | 35V |
| C234 | 1-131-215-00 | tantalum | 1 | 10% | 35V |
| C236 | 1-131-218-21 | tantalum | 3.3 | 10% | 35V |
| C237 | 1-141-022-21 | trimmer | 20pF | | |
| C249 | 1-107-189-00 | mica | 30pF | 10% | 500V |
| C251 | 1-141-022-21 | trimmer | 20pF | | |
| C290 | 1-141-022-21 | trimmer | 20pF | | |
| **V1 board** | | | | | |
| C312 | 1-107-088-00 | mica | 130pF | 5% | 50V |
| C313 | 1-107-088-00 | mica | 130pF | 5% | 50V |
| C314 | 1-107-075-00 | mica | 39pF | 5% | 50V |
| C317 | 1-107-233-00 | mica | 430pF | 5% | 50V |
| C318 | 1-107-090-00 | mica | 160pF | 5% | 50V |
| C323 | 1-107-089-00 | mica | 150pF | 5% | 50V |
| C325 | 1-107-072-00 | mica | 30pF | 5% | 50V |
| C333 | 1-107-077-00 | mica | 47pF | 5% | 50V |
| C352 | 1-107-085-00 | mica | 100pF | 5% | 50V |

| Ref. No. | Parts No. | Description | | | |
|---|---|---|---|---|---|
| **SV4 board** | | | | | |
| C417 | 1-131-212-00 | tantalum | 0.33 | 10% | 35V |
| C419 | 1-131-212-00 | tantalum | 0.33 | 10% | 35V |
| C421 | 1-131-212-00 | tantalum | 0.33 | 10% | 35V |
| C424 | 1-108-611-00 | mylar | 0.22 | 5% | 50V |
| C447 | 1-101-455-00 | ceramic | 0.001 | 20% | 50V |
| C448 | 1-101-455-00 | ceramic | 0.001 | 20% | 50V |
| C449 | 1-107-085-00 | mica | 100pF | 5% | 50V |
| C450 | 1-107-085-00 | mica | 100pF | 5% | 50V |
| C455 | 1-108-607-00 | mylar | 0.15 | 5% | 50V |
| C456 | 1-131-214-00 | tantalum | 0.68 | 10% | 35V |
| C463 | 1-108-595-00 | mylar | 0.047 | 5% | 50V |
| C853 | 1-107-085-00 | mica | 100pF | 5% | 50V |
| C854 | 1-107-085-00 | mica | 100pF | 5% | 50V |
| **A2 board** | | | | | |
| C501 | 1-130-016-00 | polypropylene | 680pF | 10% | 50V |
| C504 | 1-108-555-00 | mylar | 0.001 | 5% | 50V |
| C506 | 1-107-077-00 | mica | 47pF | 5% | 50V |
| C510 | 1-107-085-00 | mica | 100pF | 5% | 50V |
| C516 | 1-108-555-00 | mylar | 0.001 | 5% | 50V |
| C518 | 1-107-077-00 | mica | 47pF | 5% | 50V |
| C523 | 1-107-085-00 | mica | 100pF | 5% | 50V |
| C533 | 1-131-213-00 | tantalum | 0.47 | 10% | 35V |
| C534 | 1-130-017-00 | polypropylene | 820pF | 10% | 50V |
| C535 | 1-130-012-00 | polypropylene | 330pF | 10% | 50V |
| C536 | 1-141-010-XX | trimmer | 30~200pF | | 1000V |
| C542 | 1-129-710-00 | plastic | 0.0047 | 10% | 630V |
| C550 | 1-107-209-00 | mica | 20pF | 5% | 500V |
| **R5 board** | | | | | |
| C602 | 1-121-074-00 | elect | 1000 | | 50V |
| **SV5 board** | | | | | |
| C705 | 1-108-740-00 | mylar | 0.033 | 5% | 100V |
| C709 | 1-131-215-00 | tantalum | 1 | 10% | 35V |
| C714 | 1-161-059-00 | ceramic | 0.047 | | 50V |
| C717 | 1-161-039-00 | ceramic | 0.001 | 20% | 50V |

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|---|---|---|---|---|---|
| **ED6 board** | | | | | |
| C801 | 1-131-219-00 | tantalum | 4.7 | 10% | 35V |
| C802 | 1-131-219-00 | tantalum | 4.7 | 10% | 35V |
| C803 | 1-131-218-00 | tantalum | 3.3 | 10% | 35V |
| C806 | 1-131-219-00 | tantalum | 4.7 | 10% | 35V |
| **SY7 board** | | | | | |
| C1106 | 1-107-085-00 | mica | 100pF | 10% | 50V |
| C1114 | 1-107-085-00 | mica | 100pF | 10% | 50V |

## CONNECTOR

**frame**

| | | |
|---|---|---|
| CN001 | 1-507-251-XX | jack, mini JM35-M10; MIC IN |
| CN002 | 1-507-251-XX | jack, mini JM35-M10; AUX IN |
| CN003 | 1-507-251-XX | jack, mini JM35-M10; LINE OUT |
| CN004 | 1-507-251-XX | jack, mini JM35-M10; RF OUT |
| CN005 | 1-526-527-00 | receptacle, DIN 6P, female; CAMERA |
| CN006 | 1-509-095-00 | receptacle, 8P, female; TV |
| ⚠CN007 | 1-509-547-00 | receptacle, 3P, male; AC IN |
| CN012 | 1-509-884-21 | receptacle, UHF; VIDEO IN |
| CN013 | 1-509-884-21 | receptacle, UHF; VIDEO OUT |
| CN014 | 1-507-290-00 | 6P connector; RF MODULATOR |

| Ref. No. | Parts No. | Description |
|---|---|---|
| **DIODE** | | |
| **SV2 board** | | |
| D101 | 8-719-200-12 | 10E-2 |
| D102 | 8-719-200-12 | 10E-2 |
| D103 | 8-719-422-21 | 1T22AM |
| D104 | 8-719-422-21 | 1T22AM |
| D105 | 8-719-815-55 | 1S1555 |
| D106 | 8-719-815-55 | 1S1555 |
| D107 | 8-719-815-55 | 1S1555 |
| **V3 board** | | |
| D201 | 8-719-815-55 | 1S1555 |
| D202 | 8-719-815-55 | 1S1555 |
| D203 | 8-719-815-55 | 1S1555 |
| D204 | 8-719-815-55 | 1S1555 |
| D205 | 8-719-815-55 | 1S1555 |
| D206 | 8-719-815-80 | 1S1587 |
| D207 | 8-719-815-80 | 1S1587 |
| D208 | 8-719-200-12 | 10E-2 |
| D209 | 8-719-815-55 | 1S1555 |
| **V1 board** | | |
| D301 | 8-719-815-55 | 1S1555 |
| D302 | 8-719-815-55 | 1S1555 |
| D303 | 8-719-815-80 | 1S1587 |
| D304 | 8-719-815-80 | 1S1587 |
| D305 | 8-719-422-21 | 1T22AM |
| D306 | 8-719-422-21 | 1T22AM |
| D307 | 8-719-815-55 | 1S1555 |
| D308 | 8-719-422-21 | 1T22AM |
| D309 | 8-719-422-21 | 1T22AM |
| D310 | 8-719-422-21 | 1T22AM |
| D311 | 8-719-422-21 | 1T22AM |
| D312 | 8-719-815-55 | 1S1555 |

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|---|---|---|
| **SV4 board** | | |
| D401 | 8-719-815-55 | 1S1555 |
| D402 | 8-719-815-55 | 1S1555 |
| D403 | 8-719-815-55 | 1S1555 |
| D404 | 8-719-815-55 | 1S1555 |
| D405 | 8-719-815-55 | 1S1555 |
| D406 | 8-719-815-55 | 1S1555 |
| D408 | 8-719-815-55 | 1S1555 |
| D409 | 8-719-815-55 | 1S1555 |
| D410 | 8-719-143-07 | RD4.3E-B |
| D415 | 8-719-815-55 | 1S1555 |
| D416 | 8-719-815-55 | 1S1555 |
| D420 | 8-719-815-55 | 1S1555 |
| D421 | 8-719-815-55 | 1S1555 |
| D423 | 8-719-815-55 | 1S1555 |
| D424 | 8-719-815-55 | 1S1555 |
| D425 | 8-719-815-55 | 1S1555 |
| D426 | 8-719-815-55 | 1S1555 |
| D851 | 8-719-815-55 | 1S1555 |
| D852 | 8-719-815-55 | 1S1555 |
| D853 | 8-719-815-55 | 1S1555 |
| **A2 board** | | |
| D501 | 8-719-422-21 | 1T22AM |
| D502 | 8-719-422-21 | 1T22AM |
| D503 | 8-719-422-21 | 1T22AM |
| D504 | 8-719-422-21 | 1T22AM |
| **R5 board** | | |
| D601 | 8-719-911-55 | UO5G |
| D602 | 8-719-911-55 | UO5G |
| D603 | 8-719-931-13 | EQB01-13 |
| D604 | 8-719-143-07 | RD4.3E-B |
| D605 | 8-710-309-00 | MZ-09 |
| D606 | 8-719-501-34 | S3VC40R |
| C607 | 8-719-500-34 | S3VC40 |

| Ref. No. | Parts No. | Description |
|---|---|---|
| **SV5 board** | | |
| D701 | 8-719-931-13 | EQB01-13 |
| **ED6 board** | | |
| D801 | 8-719-815-55 | 1S1555 |
| D802 | 8-719-815-55 | 1S1555 |
| D803 | 8-719-815-55 | 1S1555 |
| D804 | 8-719-815-55 | 1S1555 |
| D805 | 8-719-815-55 | 1S1555 |
| D806 | 8-719-815-55 | 1S1555 |
| **SY3 board** | | |
| D901 | 8-719-815-55 | 1S1555 |
| **SY7 board** | | |
| D1101 | 8-719-815-55 | 1S1555 |

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| Ref. No. | Parts No. | Description |
|---|---|---|
| **FUSE** | | |
| **frame** | | |
| ⚠F001 | 1-532-259-00 | T1.6A |
| ⚠F002 | 1-532-259-00 | T1.6A |
| ⚠F003 | 1-532-259-00 | T1.6A |
| ⚠F004 | 1-532-066-00 | T400mA |
| ⚠F005 | 1-532-066-00 | T400mA |
| ⚠F006 | 1-532-078-00 | T1A |
| ⚠F007 | 1-532-215-00 | T800mA |
| **FILTER** | | |
| **frame** | | |
| FL001 | 1-231-191-00 | feed through |
| FL002 | 1-231-191-00 | feed through |

| Ref. No. | Parts No. | Description |
|---|---|---|
| **HEAD** | | |
| **frame** | | |
| H001 | 8-829-369-10 | EPP170-2102C, AUDIO/CTL |
| H002 | 8-825-655-00 | EF18-2102A, VIDEO ERASE |
| H003 | 8-829-510-52 | H01-12, VIDEO R/P |
| **IC** | | |
| **SV2 board** | | |
| IC101 | 8-755-061-00 | CX-506A; SONY |
| **V1 board** | | |
| IC301 | 8-750-340-00 | CX-034; SONY |
| **SV4 board** | | |
| IC401 | 8-759-659-46 | M5946P, DTL (DTμL9946; FSC) |
| **SV5 board** | | |
| IC701 | 8-750-321-00 | CX-032B; SONY |
| **SY7 board** | | |
| IC1101 | 8-757-330-00 | CX733, P-MOS; SONY |

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| Ref. No. | Parts No. | Description | | |
|---|---|---|---|---|
| **INDUCTOR** | | | | |
| **frame** | | | | |
| L003 | 1-462-038-11 | coil, brake | | |
| **V3 board** | | | | |
| L201 | 1-407-162-XX | micro | 27μH | 10% |
| L202 | 1-407-162-XX | micro | 27μH | 10% |
| L203 | 1-407-205-XX | micro | 8.2mH | 10% |
| L204 | 1-407-205-XX | micro | 8.2mH | 10% |
| L205 | 1-407-255-00 | variable | 47μH | |
| L206 | 1-407-191-XX | micro | 470μH | 10% |
| **V1 board** | | | | |
| L301 | 1-407-157-XX | micro | 10μH | 10% |
| L302 | 1-407-160-XX | micro | 18μH | 10% |
| L303 | 1-407-163-XX | micro | 33μH | 10% |
| L304 | 1-407-160-XX | micro | 18μH | 10% |
| L305 | 1-407-189-XX | micro | 8.2μH | 10% |
| L306 | 1-407-160-XX | micro | 18μH | 10% |
| L307 | 1-407-169-XX | micro | 100μH | 10% |
| L308 | 1-407-163-XX | micro | 33μH | 10% |
| **SV4 board** | | | | |
| L401 | 1-407-090-00 | micro | 1.5mH | 10% |
| **A2 board** | | | | |
| L501 | 1-407-198-XX | micro | 2.2mH | 10% |
| L502 | 1-407-240-00 | variable | 22mH | |
| L503 | 1-407-198-XX | micro | 2.2mH | 10% |
| L504 | 1-407-198-XX | micro | 2.2mH | 10% |
| L505 | 1-407-198-XX | micro | 2.2mH | 10% |
| **SV5 board** | | | | |
| L701 | 1-427-265-00 | noise filter | | |

| Ref. No. | Parts No. | Description |
|---|---|---|
| **MOTOR** | | |
| **frame** | | |
| ⚠M001 | 8-831-635-00 | HC634B, AC; MAIN |
| M002 | 8-834-742-01 | D742F, DC; CAPSTAN |
| **METER** | | |
| **frame** | | |
| ME001 | 1-524-072-00 | TRACKING |
| ME002 | 1-524-073-00 | VIDEO LEVEL |
| ME003 | 1-524-076-00 | AUDIO LEVEL |

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|---|---|---|

## MICRO MODULE

**V1 board**

| | | |
|---|---|---|
| **MM301** | **8-749-900-10** | **CV-001A** |

**SV4 board**

| | | |
|---|---|---|
| **MM401** | **8-749-900-10** | **CV-001A** |
| **MM402** | **8-749-900-10** | **CV-001A** |
| **MM403** | **8-749-900-10** | **CV-001A** |
| **MM404** | **8-749-900-10** | **CV-001A** |
| **MM405** | **8-749-901-10** | **CF-011C** |
| **MM410** | **8-749-900-10** | **CV-001A** |
| **MM851** | **8-749-901-10** | **CF-011C** |

## PG COIL

**frame**

| | | |
|---|---|---|
| **PG001** | **1-419-019-00** | **coil, PG** |
| **PG002** | **1-419-019-00** | **coil, PG** |

| Ref. No. | Parts No. | Description |
|---|---|---|

## LAMP

**frame**

| | | |
|---|---|---|
| **PL001** | **1-518-126-11** | **2.5V 250mA; AUDIO METER** |
| **PL002** | **1-518-126-11** | **2.5V 250mA; VIDEO METER** |
| **PL003** | **1-518-134-XX** | **2.0V 100mA; REC** |
| **PL004** | **1-518-134-XX** | **2.0V 100mA; AUDIO AGC** |
| **PL005** | **1-518-134-XX** | **2.0V 100mA; VIDEO AGC** |

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| Ref. No. | Parts No. | Description |
|---|---|---|
| **TRANSISTOR** | | |
| **SV2 board** | | |
| Q101 | 8-729-456-25 | 2SA564A-P |
| Q102 | 8-729-663-47 | 2SC1364 |
| Q103 | 8-726-388-00 | 2SC634A |
| Q104 | 8-729-456-25 | 2SA564A-P |
| Q105 | 8-729-663-47 | 2SC1364 |
| Q106 | 8-729-456-25 | 2SA564A-P |
| Q107 | 8-729-663-47 | 2SC1364 |
| Q108 | 8-722-394-01 | 2SK23A-940 |
| Q109 | 8-720-216-60 | 2SD291 |
| Q110 | 8-729-663-47 | 2SC1364 |
| Q111 | 8-727-788-00 | 2SA678 |
| **V3 board** | | |
| Q201 | 8-722-381-20 | 2SK23A-812 |
| Q202 | 8-724-375-01 | 2SC403C |
| Q203 | 8-724-375-01 | 2SC403C |
| Q204 | 8-725-412-00 | 2SC1124 |
| Q205 | 8-724-375-01 | 2SC403C |
| Q207 | 8-729-456-25 | 2SA564A-P |
| Q208 | 8-724-375-01 | 2SC463C |
| Q209 | 8-724-375-01 | 2SC403C |
| Q210 | 8-724-375-01 | 2SC403C |
| Q211 | 8-724-375-01 | 2SC403C |
| Q212 | 8-724-375-01 | 2SC403C |
| Q213 | 8-725-412-00 | 2SC1124 |
| Q214 | 8-724-375-01 | 2SC403C |
| Q215 | 8-724-375-01 | 2SC403C |
| Q216 | 8-725-412-00 | 2SC1124 |
| Q217 | 8-724-375-01 | 2SC403C |
| Q218 | 8-729-663-47 | 2SC1364 |
| Q219 | 8-729-456-25 | 2SA564A-P |
| Q220 | 8-723-302-00 | 2SK43-2 |
| Q221 | 8-726-388-00 | 2SC634A |
| Q222 | 8-724-375-01 | 2SC403C |
| Q223 | 8-723-302-00 | 2SK43-2 |
| Q224 | 8-726-388-00 | 2SC634A |
| Q225 | 8-724-375-01 | 2SC403C |
| Q226 | 8-724-375-01 | 2SC403C |
| Q227 | 8-724-375-01 | 2SC403C |
| Q228 | 8-724-375-01 | 2SC403C |
| **V1 board** | | |
| Q301 | 8-724-375-01 | 2SC403C |
| Q302 | 8-724-375-01 | 2SC403C |
| Q303 | 8-724-375-01 | 2SC403C |
| Q304 | 8-724-375-01 | 2SC403C |
| Q305 | 8-729-456-25 | 2SA564A-P |
| Q306 | 8-724-375-01 | 2SC403C |
| Q307 | 8-724-375-01 | 2SC403C |
| Q308 | 8-724-375-01 | 2SC403C |
| Q309 | 8-724-375-01 | 2SC403C |
| Q310 | 8-724-375-01 | 2SC403C |
| Q311 | 8-724-375-01 | 2SC403C |
| Q312 | 8-724-375-01 | 2SC403C |
| Q313 | 8-724-375-01 | 2SC403C |
| Q314 | 8-724-375-01 | 2SC403C |
| Q315 | 8-724-375-01 | 2SC403C |
| Q316 | 8-729-456-25 | 2SA564A-P |
| Q317 | 8-724-375-01 | 2SC403C |
| Q318 | 8-724-375-01 | 2SC403C |
| Q319 | 8-724-375-01 | 2SC403C |
| **SV4 board** | | |
| Q401 | 8-729-663-47 | 2SC1364 |
| Q402 | 8-729-456-25 | 2SA564A-P |
| Q403 | 8-729-663-47 | 2SC1364 |
| Q404 | 8-729-456-25 | 2SA564A-P |
| Q405 | 8-729-663-47 | 2SC1364 |
| Q406 | 8-722-383-40 | 2SK23A-834 |
| Q407 | 8-729-663-47 | 2SC1364 |
| Q408 | 8-729-663-47 | 2SC1364 |
| Q415 | 8-729-663-47 | 2SC1364 |

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| Ref. No. | Parts No. | Description |
|---|---|---|
| **A2 board** | | |
| Q501 | 8-726-368-10 | 2SC632A |
| Q502 | 8-726-368-10 | 2SC632A |
| Q503 | 8-729-663-47 | 2SC1364 |
| Q504 | 8-729-663-47 | 2SC1364 |
| Q505 | 8-729-663-47 | 2SC1364 |
| Q506 | 8-729-663-47 | 2SC1364 |
| Q507 | 8-729-663-47 | 2SC1364 |
| Q508 | 8-729-663-47 | 2SC1364 |
| Q509 | 8-729-663-47 | 2SC1364 |
| Q510 | 8-729-663-47 | 2SC1364 |
| Q513 | 8-725-412-00 | 2SC1124 |
| **R5 board** | | |
| Q601 | 8-729-311-51 | 2SC1115 |
| Q602 | 8-725-412-00 | 2SC1124 |
| Q603 | 8-724-375-01 | 2SC403C |
| Q604 | 8-725-412-00 | 2SC1124 |
| Q605 | 8-724-375-01 | 2SC403C |
| Q606 | 8-725-412-00 | 2SC1124 |
| Q607 | 8-724-375-01 | 2SC403C |
| **SV5 board** | | |
| Q701 | 8-729-663-47 | 2SC1364 |
| Q702 | 8-729-663-47 | 2SC1364 |
| Q703 | 8-729-663-47 | 2SC1364 |
| Q704 | 8-720-213-60 | 2SD291 |
| Q705 | 8-729-663-47 | 2SC1364 |
| Q706 | 8-729-663-47 | 2SC1364 |

| Ref. No. | Parts No. | Description |
|---|---|---|
| **ED6 board** | | |
| Q801 | 8-760-413-00 | 2SC1475 |
| Q802 | 8-729-660-47 | 2SC1364 |
| Q803 | 8-729-660-47 | 2SC1364 |
| Q804 | 8-729-660-47 | 2SC1364 |
| Q805 | 8-729-660-47 | 2SC1364 |
| Q806 | 8-729-660-47 | 2SC1364 |
| Q807 | 8-724-375-01 | 2SC403C |
| Q808 | 8-724-375-01 | 2SC403C |
| Q809 | 8-725-412-00 | 2SC1124 |
| Q810 | 8-724-375-01 | 2SC403C |
| Q811 | 8-724-375-01 | 2SC403C |
| **SY3 board** | | |
| Q901 | 8-724-375-01 | 2SC403C |
| Q902 | 8-724-375-01 | 2SC403C |
| Q903 | 8-729-456-25 | 2SA564A-P |
| **SY7 board** | | |
| Q1101 | 8-724-375-01 | 2SC403C |
| Q1102 | 8-724-375-01 | 2SC403C |
| Q1103 | 8-724-375-01 | 2SC403C |
| Q1104 | 8-724-612-77 | 2SA1027R |

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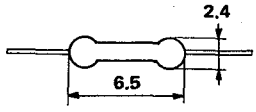
## RESISTOR

**Parts that are not listed in the "reference numbers order list" are shown in following table.**
**Reference numbers are omitted.**

**CARBON RESISTOR (1/4W)** ±5%, 1/4W, non-special type
1 Ω through 1 MΩ




Parts No. 1-246-□□□-00

| Value | Parts No. -□□□- | Value | Parts No. -□□□- | Value | Parts No. -□□□- | Value | Parts No. -□□□- |
|---|---|---|---|---|---|---|---|
| 1 Ω | 401 | 33 Ω | 437 | 1 kΩ | 473 | 33 kΩ | 509 |
| 1.1 | 402 | 36 | 438 | 1.1 | 474 | 36 | 510 |
| 1.2 | 403 | 39 | 439 | 1.2 | 475 | 39 | 511 |
| 1.3 | 404 | 43 | 440 | 1.3 | 476 | 43 | 512 |
| 1.5 | 405 | 47 | 441 | 1.5 | 477 | 47 | 513 |
| 1.6 | 406 | 51 | 442 | 1.6 | 478 | 51 | 514 |
| 1.8 | 407 | 56 | 443 | 1.8 | 479 | 56 | 515 |
| 2 | 408 | 62 | 444 | 2 | 480 | 62 | 516 |
| 2.2 | 409 | 68 | 445 | 2.2 | 481 | 68 | 517 |
| 2.4 | 410 | 75 | 446 | 2.4 | 482 | 75 | 518 |
| 2.7 | 411 | 82 | 447 | 2.7 | 483 | 82 | 519 |
| 3 | 412 | 91 | 448 | 3.0 | 484 | 91 | 520 |
| 3.3 | 413 | 100 Ω | 449 | 3.3 | 485 | 100 kΩ | 521 |
| 3.6 | 414 | 110 | 450 | 3.6 | 486 | 110 | 522 |
| 3.9 | 415 | 120 | 451 | 3.9 | 487 | 120 | 523 |
| 4.3 | 416 | 130 | 452 | 4.3 | 488 | 130 | 524 |
| 4.7 | 417 | 150 | 453 | 4.7 | 489 | 150 | 525 |
| 5.1 | 418 | 160 | 454 | 5.1 | 490 | 160 | 526 |
| 5.6 | 419 | 180 | 455 | 5.6 | 491 | 180 | 527 |
| 6.2 | 420 | 200 | 456 | 6.2 | 492 | 200 | 528 |
| 6.8 | 421 | 220 | 457 | 6.8 | 493 | 220 | 529 |
| 7.5 | 422 | 240 | 458 | 7.5 | 494 | 240 | 530 |
| 8.2 | 423 | 270 | 459 | 8.2 | 495 | 270 | 531 |
| 9.1 | 424 | 300 | 460 | 9.1 | 496 | 300 | 532 |
| 10 Ω | 425 | 330 | 461 | 10 kΩ | 497 | 330 | 533 |
| 11 | 426 | 360 | 462 | 11 | 498 | 360 | 534 |
| 12 | 427 | 390 | 463 | 12 | 499 | 390 | 535 |
| 13 | 428 | 430 | 464 | 13 | 500 | 430 | 536 |
| 15 | 429 | 470 | 465 | 15 | 501 | 470 | 537 |
| 16 | 430 | 510 | 466 | 16 | 502 | 510 | 538 |
| 18 | 431 | 560 | 467 | 18 | 503 | 560 | 539 |
| 20 | 432 | 620 | 468 | 20 | 504 | 620 | 540 |
| 22 | 433 | 680 | 469 | 22 | 505 | 680 | 541 |
| 24 | 434 | 750 | 470 | 24 | 506 | 750 | 542 |
| 27 | 435 | 820 | 471 | 27 | 507 | 820 | 543 |
| 30 | 436 | 910 | 472 | 30 | 508 | 910 | 544 |
| | | | | | | 1 MΩ | 545 |

| Ref. No. | Parts No. | Description |
|---|---|---|
| **frame** | | |
| R001 | 1-222-401-00 | VAR with SW, carbon 100K(B); TRACKING |
| R002 | 1-222-402-00 | VAR 300(B); VIDEO LEVEL |
| R003 | 1-222-403-00 | VAR, carbon 10K(A); AUDIO LEVEL |
| **SV2 board** | | |
| R125 | 1-224-646-XX | VAR, carbon 22K(B) |
| R128 | 1-244-877-00 | carbon 1.5K 5% ½W |
| R129 | 1-224-646-XX | VAR, carbon 22K(B) |
| R139 | 1-224-650-XX | VAR, carbon 470K(B) |
| R141 | 1-224-646-XX | VAR, carbon 22K(B) |
| **V3 board** | | |
| R214 | 1-207-639-00 | wirewound 330 10% 2W |
| R221 | 1-224-249-XX | VAR, solid 1K(B) |
| R225 | 1-207-638-00 | wirewound 220 10% 2W |
| R228 | 1-224-250-XX | VAR, metal 2.2K(B) |
| R237 | 1-224-250-XX | VAR, metal 2.2K(B) |
| R238 | 1-224-251-XX | VAR, metal 4.7K(B) |
| R242 | 1-206-648-00 | metal 220 5% 2W |
| R243 | 1-224-248-XX | VAR, metal 470(B) |
| R248 | 1-224-248-XX | VAR, metal 470(B) |
| R260 | 1-221-986-00 | VAR, solid 330(B) |
| R264 | 1-224-250-XX | VAR, metal 2.2K(B) |
| R269 | 1-221-986-00 | VAR, solid 330(B) |
| R273 | 1-224-250-XX | VAR, metal 2.2K(B) |
| R283 | 1-224-252-XX | VAR, metal 10K(B) |
| R285 | 1-224-252-XX | VAR, metal 10K(B) |
| R293 | 1-224-251-XX | VAR, metal 4.7K(B) |
| R296 | 1-207-640-00 | wirewound 470 10% 2W |

| Ref. No. | Parts No. | Description |
|---|---|---|
| **V1 board** | | |
| R305 | 1-221-492-XX | VAR, carbon 100(B) |
| R306 | 1-244-876-00 | carbon 1.3K 5% ½W |
| R307 | 1-244-876-00 | carbon 1.3K 5% ½W |
| R311 | 1-244-879-00 | carbon 1.8K 5% ½W |
| R315 | 1-224-641-XX | VAR, carbon 470(B) |
| R319 | 1-224-248-XX | VAR, metal 470(B) |
| R336 | 1-224-868-00 | carbon 620 5% ½W |
| R345 | 1-224-252-XX | VAR, solid 10K(B) |
| ⚠R347 | 1-207-914-00 | wirewound 270 10% 2W |
| ⚠R357 | 1-207-914-00 | wirewound 270 10% 2W |
| R365 | 1-244-868-00 | carbon 620 5% ½W |
| R370 | 1-244-866-00 | carbon 510 5% ½W |
| R377 | 1-224-254-XX | VAR, metal 47K(B) |
| R390 | 1-224-254-XX | VAR, metal 47K(B) |
| R394 | 1-224-252-XX | VAR, metal 10K(B) |
| **SV4 board** | | |
| R402 | 1-244-881-00 | carbon 2.2K 5% ½W |
| R411 | 1-224-648-XX | VAR, carbon 100K(B) |
| R428 | 1-224-648-XX | VAR, carbon 100K(B) |
| R437 | 1-224-648-XX | VAR, carbon 100K(B) |
| R452 | 1-224-650-XX | VAR, carbon 470K(B) |
| R456 | 1-224-646-XX | VAR, carbon 22K(B) |
| R460 | 1-244-881-00 | carbon 2.2K 5% ½W |
| R490 | 1-244-881-00 | carbon 2.2K 5% ½W |
| R495 | 1-224-647-XX | VAR, carbon 47K(B) |
| **A2 board** | | |
| R513 | 1-224-252-XX | VAR, metal 10K(B) |
| R518 | 1-224-253-XX | VAR, metal 22K(B) |
| R538 | 1-224-252-XX | VAR, metal 10K(B) |
| R539 | 1-224-252-XX | VAR, metal 10K(B) |
| R540 | 1-244-860-00 | carbon 300 5% ½W |

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|---|---|---|
| **R5 board** | | |
| R604 | 1-224-644-XX | VAR, carbon 4.7K(B) |
| ⚠R606 | 1-207-914-00 | wirewound 270 10% 2W |
| R610 | 1-224-644-XX | VAR, carbon 4.7K(B) |
| R616 | 1-224-644-XX | VAR, carbon 4.7K(B) |
| **SV5 board** | | |
| R707 | 1-224-646-XX | VAR, carbon 22K(B) |
| R708 | 1-213-123-00 | metal 82K 5% ¼W |
| R710 | 1-244-869-00 | carbon 680 5% ½W |
| R717 | 1-224-647-XX | VAR, carbon 47K(B) |
| **ED6 board** | | |
| R819 | 1-244-870-00 | carbon 750 5% ½W |
| **SY7 board** | | |
| R1115 | 1-244-881-00 | carbon 2.2K 5% ½W |

## RELAY

| | | |
|---|---|---|
| **ED6 board** | | |
| RY819 | 1-515-225-00 | NF relay DC 12V 500Ω |

| Ref. No. | Parts No. | Description |
|---|---|---|
| **SWITCH** | | |
| **frame** | | |
| ⚠S001 | 1-516-284-00 | rocker 2-2-1 ; POWER |
| S002 | 1-516-910-00 | lever, slide 2-2-2; SLOW |
| S003 | 1-514-985-XX | lever, slide 2-6-2; AUDIO AGC |
| S004 | 1-514-985-XX | lever, slide 2-6-2; VIDEO AGC |
| S005 | 1-514-335-XX | slide 3-4-4 ; INPUT SELECT |
| S006 | 1-514-864-XX | micro ; EDIT |
| S007 | 1-516-028-XX | micro ; SHUT OFF |
| S008 | 1-514-057-XX | micro ; MAIN MOTOR STOP |
| S009 | 1-514-423-00 | micro ; REC MAIN MOTOR ON |
| S010 | 1-514-873-00 | micro ; FWD |
| S011 | 1-222-401-00 | VAR with SW, carbon 100K(B) TRACKING |
| S012 | 1-224-439-00 | VAR, carbon 500K(B); SLOW |
| S013 | 1-516-028-XX | micro; SHUT OFF |
| **V3 board** | | |
| S201 | 1-514-813-XX | slide 1-9-2 ; VIDEO PB/REC |
| **SV4 board** | | |
| S401 | 1-514-813-XX | slide 1-9-2 ; PB/REC SERVO |
| **A2 board** | | |
| S501 | 1-514-813-XX | slide 1-9-2 ; AUDIO PB/REC |

**NOTE:**

1. **The shaded and ⚠-marked components are critical to safety.**
   **Replace only with same components as specified.**

2. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Fact type will be processed, but allow for additional delivery time.

| Ref. No. | Parts No. | Description |
|---|---|---|
| **TRANSFORMER** | | |
| **frame** | | |
| ⚠T001 | 1-442-118-00 | power |
| **V3 board** | | |
| T201 | 1-425-383-00 | MOD output |
| T202 | 1-427-295-00 | output |
| T203 | 1-427-295-00 | output |
| T204 | 1-425-782-00 | RF |
| T205 | 1-425-782-00 | RF |
| **V1 board** | | |
| T301 | 1-425-544-00 | TD |
| **A2 board** | | |
| T501 | 1-405-574-00 | OSC |

| Ref. No. | Parts No. | Description |
|---|---|---|
| **X'TAL** | | |
| **SY7 board** | | |
| X1101 | 1-527-259-00 | 31.25kHz |
| **MISCELLANEOUS** | | |
| | ⚠1-509-482-00 | voltage selector |
| | 1-517-075-00 | socket, lamp |
| | 1-533-109-00 | holder, fuse |
| | ⚠1-536-392-XX | L-type terminal strip |
| | 1-548-091-XX | counter, tape |

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## 10-3. PACKING MATERIAL AND ACCESSORY (SUPPLIED)

| Ref. No. | Parts No. | Description |
|---|---|---|
| | **X-3607-023-0** | **Cleaner Ass'y, head** |
| | **X-4490-002-1** | **Cloth Ass'y, polishing** |
| | **Y-2016-101-0** | **Sony Oil Ass'y** |
| | **Y-2031-001-0** | **Cleaner Ass'y** |
| | **1-506-161-00** | **Plug, 8P, male** |
| ⚠ | **1-534-698-XX** | **Cord, power (for AEP)** |
| ⚠ | **1-534-819-00** | **Cord, power (for UK)** |
| | **3-625-071-00** | **Cushion** |
| | 3-625-072-00 | Cushion |
| | 3-625-625-00 | Carton, individual |
| | **3-701-616-00** | **Bag, poly (for 8P Plug)** |
| | **3-701-631-00** | **Bag, poly (for Empty Reel)** |
| | **3-701-647-00** | **Bag, poly (for AV-3670ACE)** |
| | **3-770-398-11** | **Manual, instruction** |
| | **3-793-068-12** | **Card, warning** |
| | **3-793-524-81** | **Instruction, UK** |
| | **3-794-146-11** | **Card, manual** |
| | **3-794-147-11** | **Card, manual** |
| | **3-794-191-11** | **Instruction, panel indication (for AEP)** |
| | Standard Products | Empty reel |

## 10-4. JIG (OPTIONAL)

| Ref. No. | Parts No. | Description |
|---|---|---|
| | **3-618-904-00** | **Video Head Dihedral Adj. Screw** |
| | **7-732-051-00** | **Tension scale (200g full scale)** |
| | **7-732-051-01** | **Tension Scale (500g full scale)** |
| | **7-732-051-02** | **Tension Scale (1000g full scale)** |
| | **8-943-505-80** | **Alignment Tape** |

**NOTE:**

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